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-1024768J2TZQW-T00H
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
2019/01/06	--	New Release	Mantle
2020/08/06	6	Update LED Life Time	Tank

1. Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8” TFT-LCD panel and LED backlight and LED driving board.

(1) Construction: 8” a-Si TFT active matrix, White LED Backlight.
(2) Resolution (pixel): 1024(R.G.B) X 768
(3) Number of the Colors : 16.7M colors (R , G , B 8 bit digital each)
(4) LCD type :SFT with Normally Black
(5) Capacitive Touch Panel : USB Interface

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	8 inch (Diagonal)	
Resolution	1024 x (RGB) x 768	dot
Pixel pitch	0.158(H) x 0.158(V)	mm
Active area	162.05(W) x 121.54(H)	mm
Module size	183.43(W) x 138.35(H) x 3.75(D)	mm
Color arrangement	RGB-stripe	
Contrast Ratio	1800:1	
Brightness	850	cd/m^2
Driver IC	RM51150+HX8684B	

3. ABSOLUTE MAX. RATINGS

3.1 TFT Absolute Maximum Ratings

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.3	5.0	V	Note1
	AVDD	-0.5	13.5		Base on IC Spec
	VGH	-0.3	42		
	VGL	VGH-42	0.3		
	VCOM	2.75	4.75		Base on Test
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	
Relative Humidity Note 2	RH	--	≤95	%	Ta≤40°C
		--	≤85	%	40°C<Ta≤50°C
		--	≤55	%	50°C<Ta≤60°C
		--	≤36	%	60°C<Ta≤70°C
		--	≤24	%	70°C<Ta≤80°C
Absolute Humidity	AH	--	≤70	g/m^3	Ta>70°C

Note1: Input voltage include RxIN0±, RxIN1±, RxIN2± and RxCLKI±.

Note2: Ta means the ambient temperature.

It is necessary to limit the relative humidity to the specified temperature range.

Condensation on the module is not allowed.

4. ELECTRICAL CHARACTERISTICS

4-1 Typical Operation Conditions

AGND=GND=0V, Ta=25℃

Item	Symbol	Min	Typ.	Max	Unit	Remark
Digital Supply Voltage	DVDD	3	3.3	3.6	V	-
Analog Supply Voltage	AVDD	12.4	12.6	12.8	V	-
Gate On Voltage	VGH	22	23	24	V	-
Gate Off Voltage	VGL	-7.5	-7	-6.5	V	-

4-2 Power Consumption

AGND=GND=0V, Ta=25℃

Item	Symbol	Condition	Min	Typ.	Max	Unit	Remark
Digital Supply Current	IVCC	DVDD=3.3V	-	TBD	-	mA	-
Analog Supply Current	IAVDD	AVDD=12.6V	-	TBD	-	mA	-
Gate On Current	IVGH	VGH=23.0V	-	TBD	-	mA	-
Gate Off Current	IVGL	VGL=-7.0V	-	TBD	-	mA	-
Power Consumption	Pane l& Gamma		-	TBD	-	mW	-

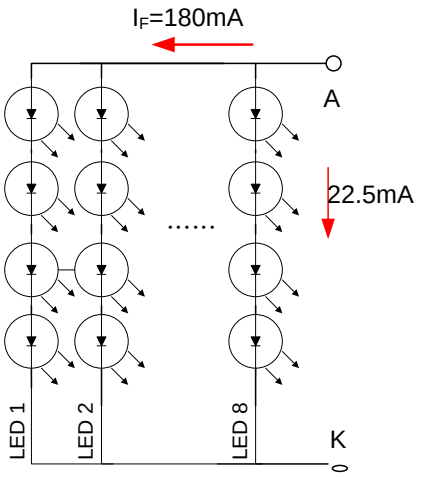
Note1: Checkered Black pattern for Typ.

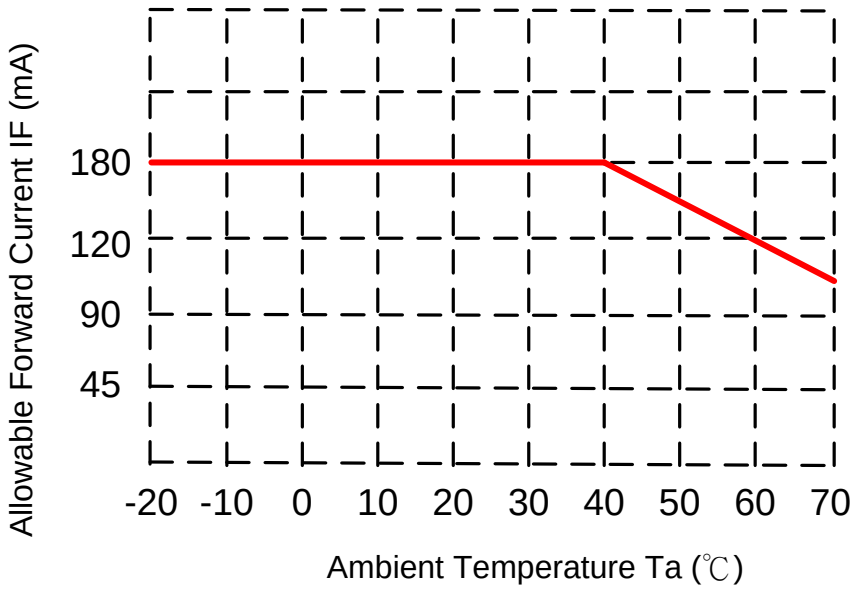
4-3 LED Driving Conditions

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED voltage	V_F	21.6	TBD	28	V	Note(1)
LED forward Current	I_F	--	180	--	mA	Ta=25℃
LED Life Time	--	--	30	--	Khr	Ta=25℃

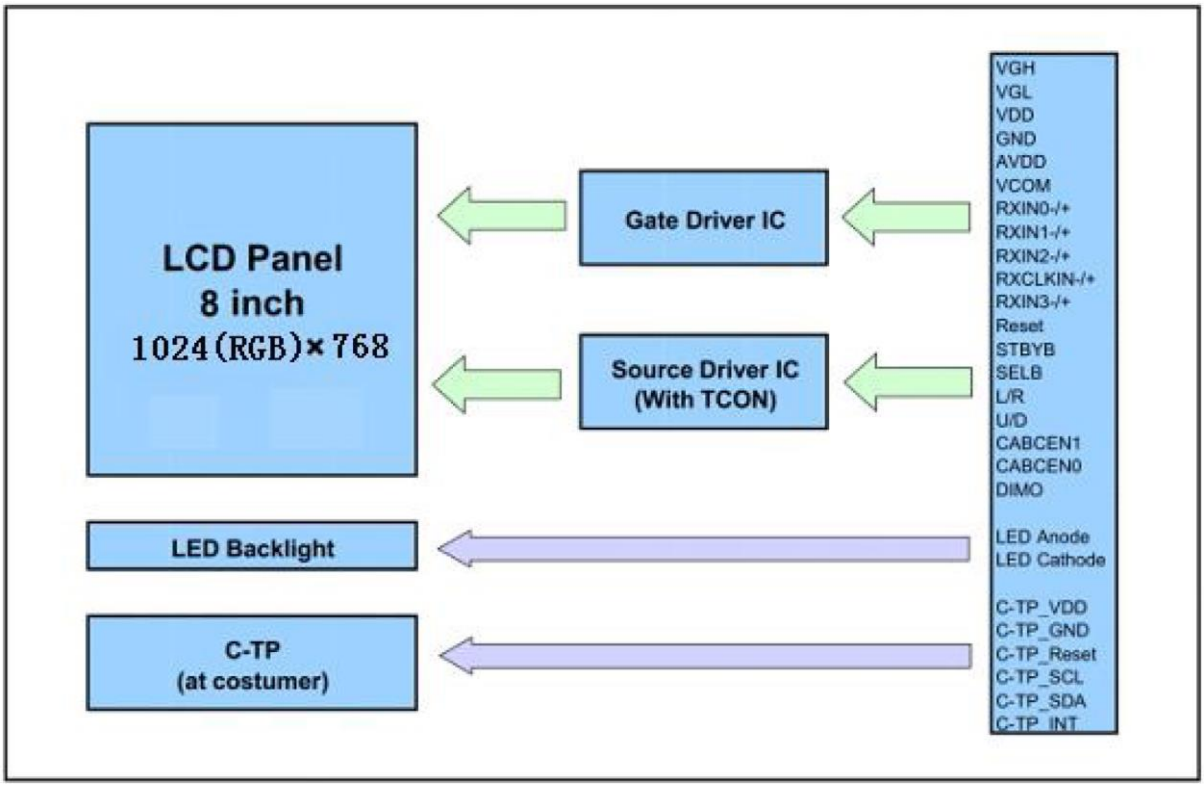
Note (1) The constant current source is needed for white LED back-light driving.
IF=180mA

Note (2) Brightness to be decreased to 50% of the initial value. Ta=25℃





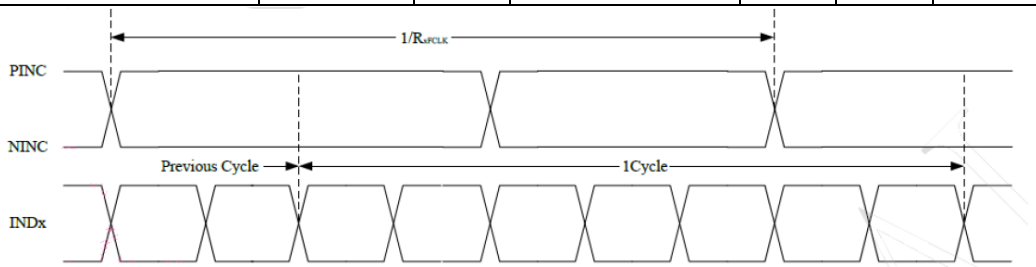
4-4 Block Diagram

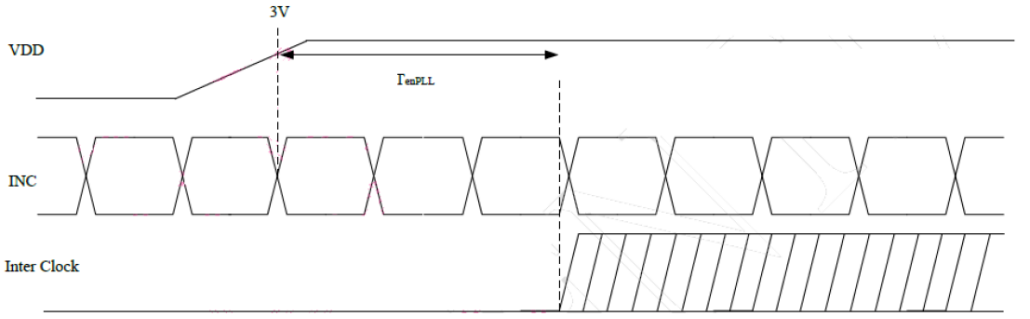


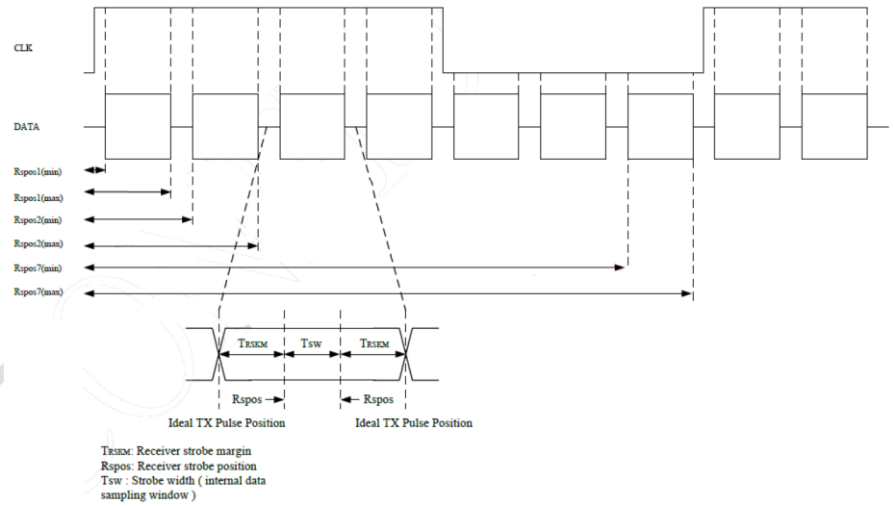
5. Timing Chart

5.1 AC Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
Clock Frequency	R_{xFCLK}	20	–	71	MHz	
Input data skew margin	T_{RSKM}	–	–	500	ps	|VID|= 400mV, R_{XVCM}=1.2V R_{XFCLK}=71MHz
Clock high time	T_{LVCH}	–	4/(7* R_{xFCLK})	–	ns	
Clock low time	T_{LVCL}	–	3/(7* R_{xFCLK})	–	ns	
PLL wake-up time	T_{enPLL}	–	–	150	us	



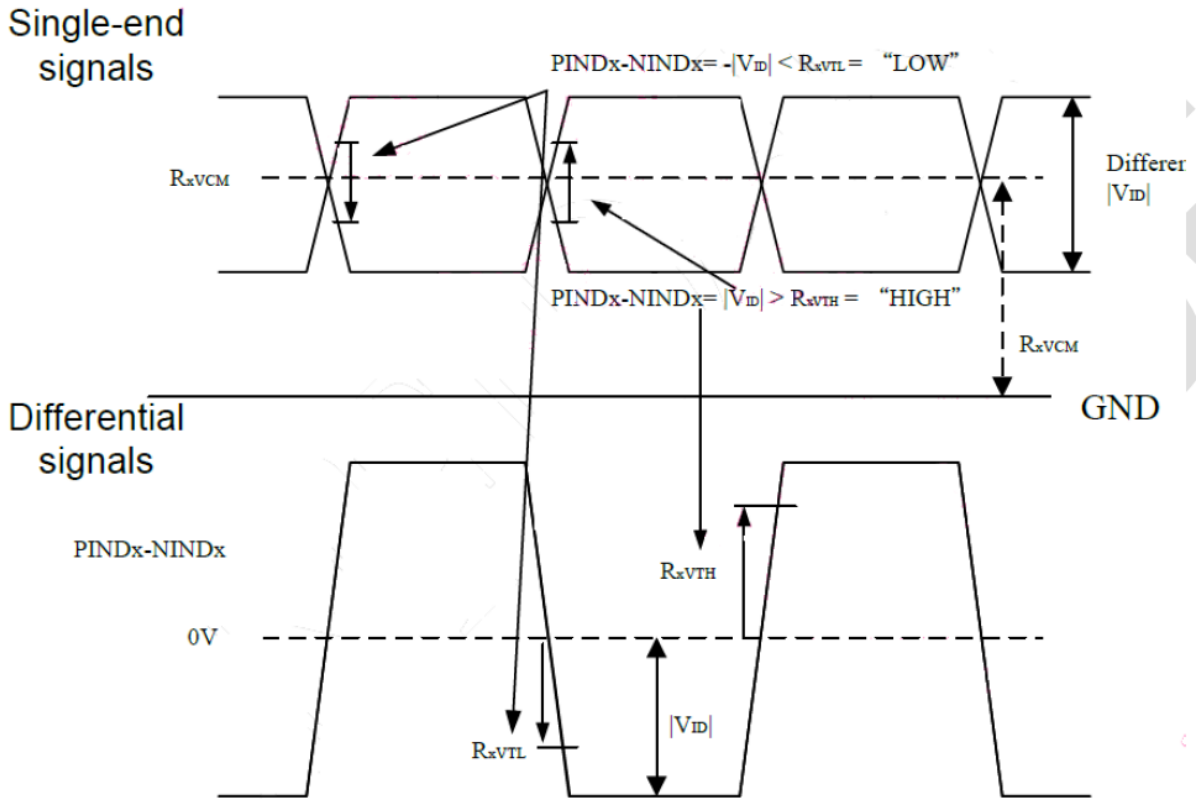




Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Modulation Frequency	SSC_{MF}	23	-	93	kHz	
Modulation Rate	SSC_{MR}	-	-	+/-3	%	LVDS clock=71MHz center spread

5.2 DC Electrical Characteristics

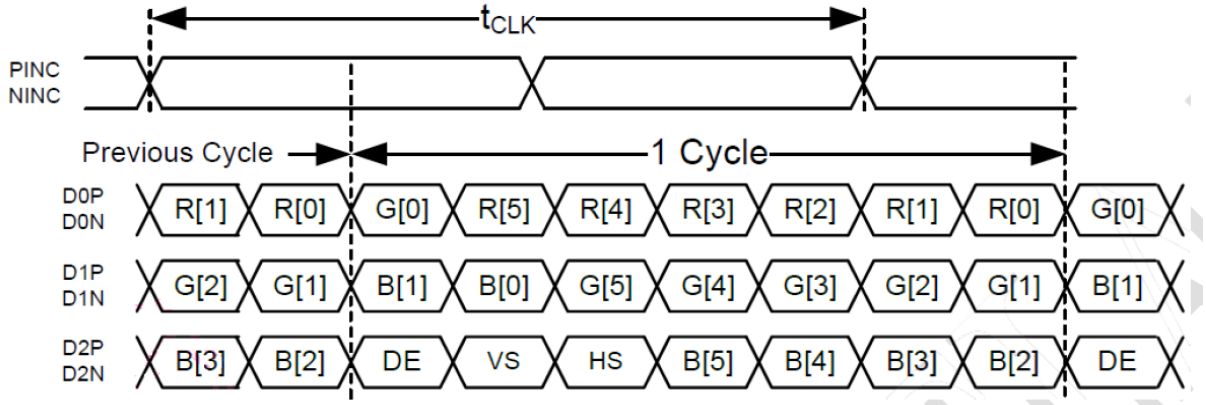
Parameter	Symbol	Min	Typ	Max	Unit	Remark
Differential input high Threshold voltage	R_{XVTH}	–	–	0.2	V	R_{XVCM}=1.2V
Differential input Low Threshold voltage	R_{XVTL}	-0.2	–	–	V	
Input voltage range (singled-end)	R_{XVIN}	0	–	VDD-1.2	V	
Differential input common mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	–	VDD-1.2-$\|V_{ID}\|/2$	V	
Differential input voltage	$\|V_{ID}\|$	0.2	–	0.6	V	
Differential input leakage Current	RV_{Xliz}	-10	–	10	uA	
LVDS Digital Operating Current	Iddlvds	–	15	30	mA	Fclk=65MHz,VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	–	10	50	uA	Clock & all functions are stopped



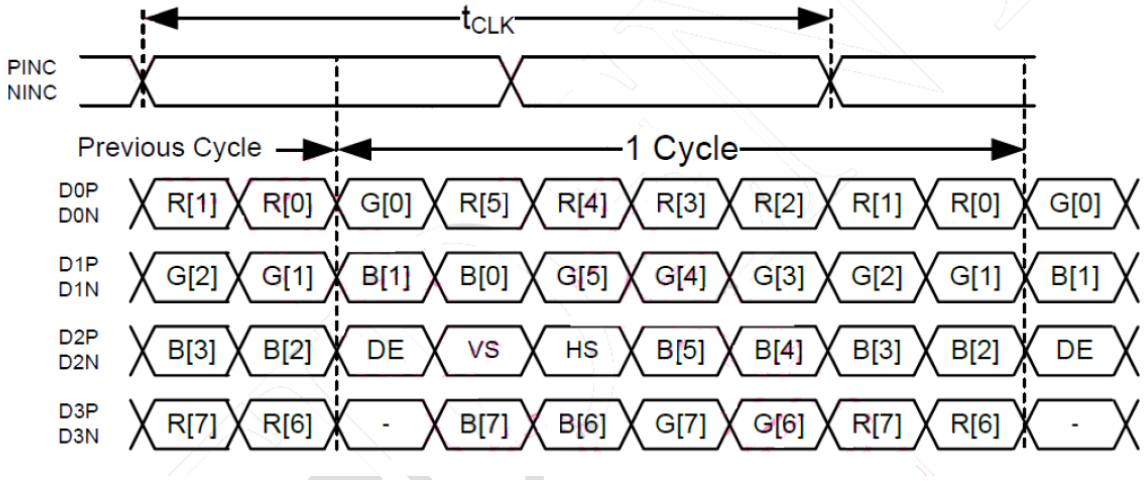
5.3 Data input format

5.3.1 LVDS data mapping

6-bit LVDS input (SELB= "H")



8-bit LVDS input (SELB= "L")



5.3.2 Parallel RGB input timing table

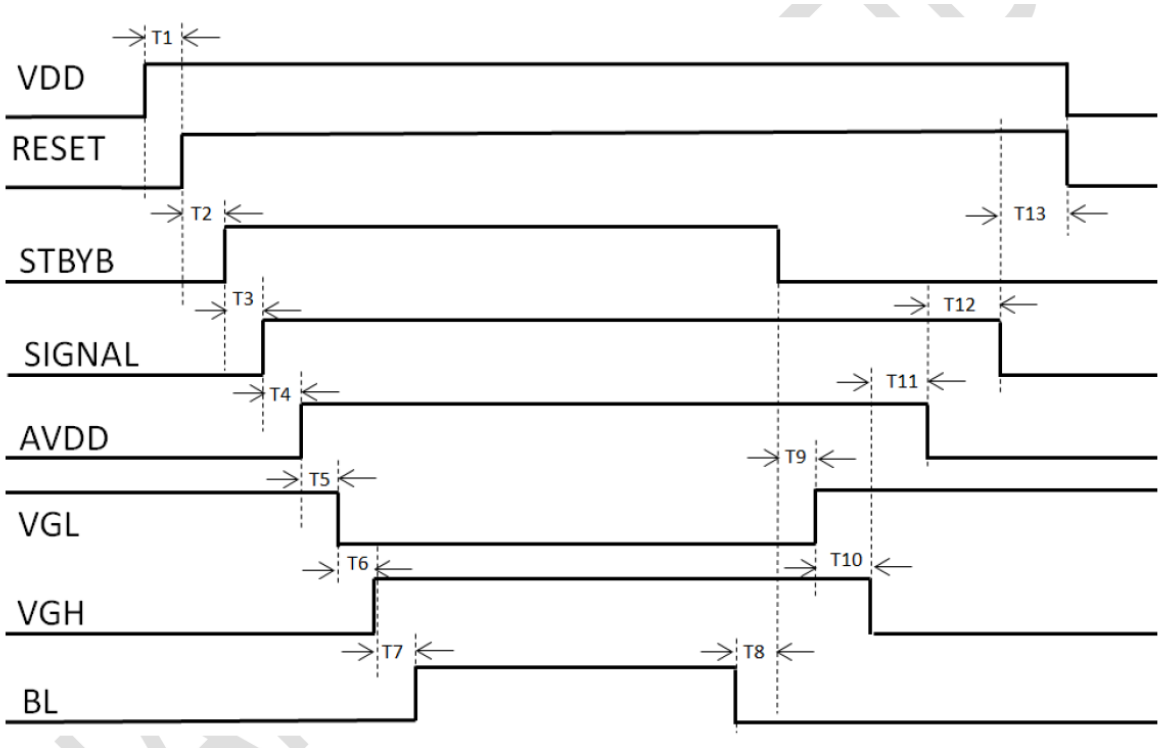
- **DE mode**

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	52	65	71	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		768		T_H
VSD period	t_V	778	806	845	T_H
VSD Blanking	tvbp+tvfp	10	38	77	T_H

DE mode(1024x768)

5.4 Power ON/OFF Sequence

Item	Symbol	Min	Typ.	Max	Unit
VDD on to Reset signal	T1	1	-	-	ms
Reset to Standby off	T2	0	-	-	
Standby off to Display signal on	T3	1	-	-	
Display signal to AVDD on	T4	33.2	-	-	
AVDD on to VGL on	T5	16.6	-	-	
VGL on to VGH on	T6	16.6	-	-	
VGH on to B/L on	T7	200	-	-	
B/L off to Standby on	T8	500	-	-	
Standby on to VGL off	T9	33.2	-	-	
VGL off to VGH off	T10	16.6	-	-	
VGH off to AVDD off	T11	16.6	-	-	
AVDD off to Display signal off	T12	16.6	-	-	
Display signal off to VDD and Reset off	T13	16.6	-	-	



6. Optical Specifications

6.1 TFT Optical Characteristics

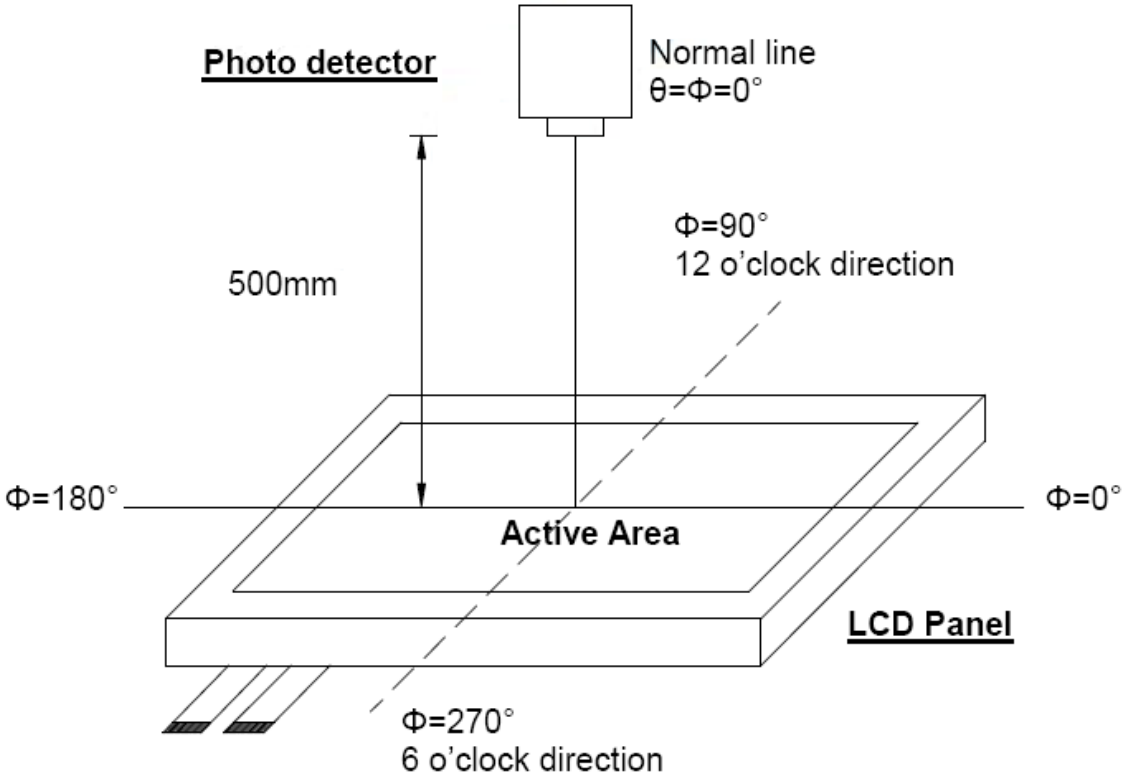
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	75	85	-	Degree	Note 2
		θB		75	85	-		
		θL		75	85	-		
		θR		75	85	-		
Contrast Ratio		CR	θ=0°	1500	1800	-		Left/right 0° Top/bottom 5°
Response Time		T_{ON}	25℃	-	35	45	ms	Note1、Note4
		T_{OFF}						
Chromaticity	White	x		-0.05	0.310	+0.05		Note1、Note5
		y			0.329			
	Red	x			0.587			
		y			0.330			
	Green	x			0.358			
		y			0.586			
	Blue	x			0.156			
		y			0.098			
Uniformity		U		80	85	-	%	Note1、Note6
NTSC				45	50	-	%	
Luminance		L		680	850	-	cd/m^2	Note7

Test Conditions:

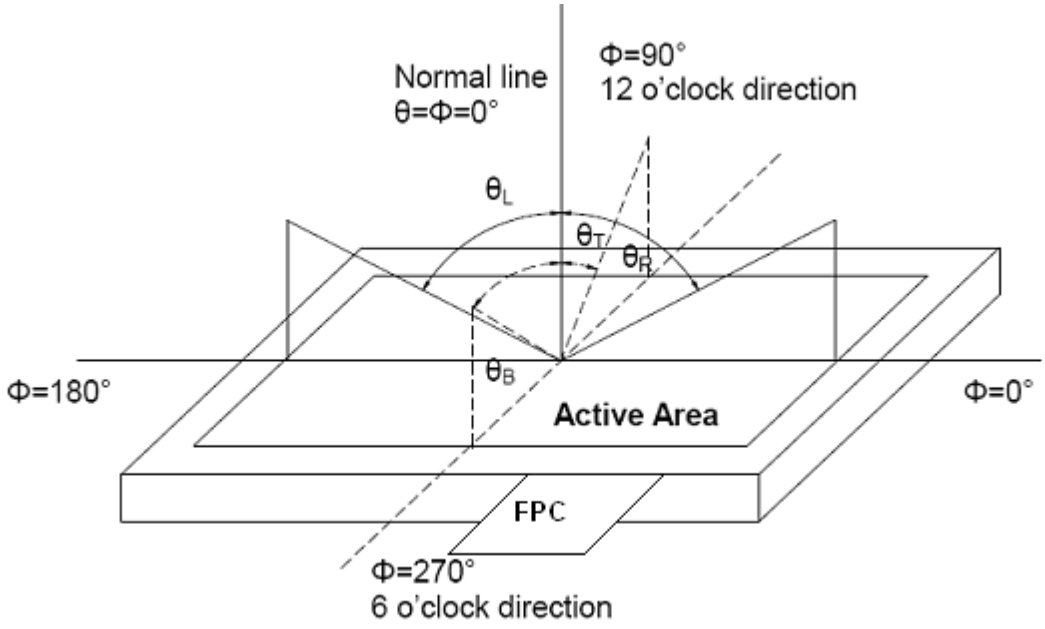
1. I_F= 180mA, the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note2.

Note 1 : Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured 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.)

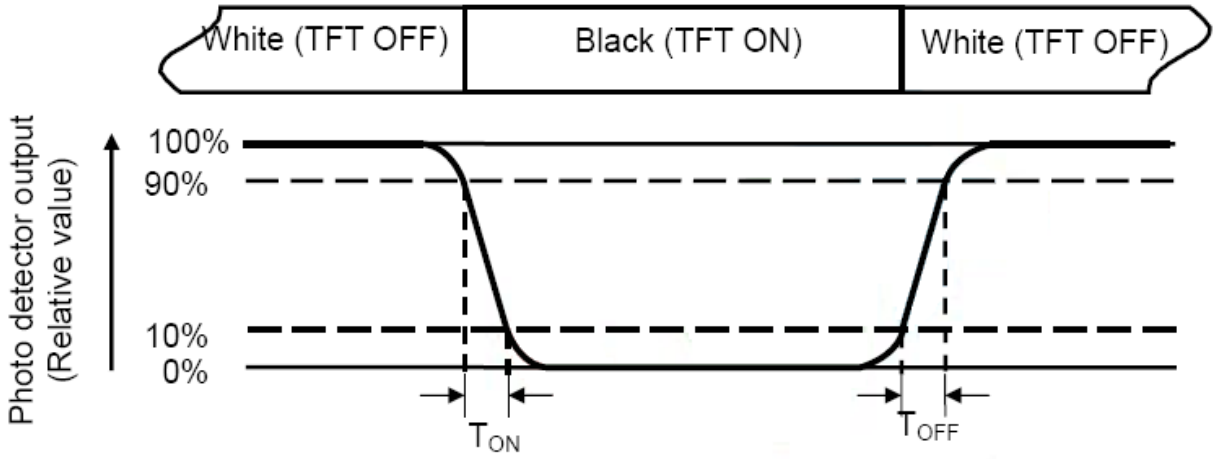


Note 2 : Definition of viewing angle range



Note 3 : 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%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 4 : Definition of contrast ratio

$$\text{Contrast Ratio(CR)} = \frac{Luminance\ measured\ when\ LCD\ on\ the\ \text{"White"}\ state}{Luminance\ measured\ when\ LCD\ on\ the\ \text{"Black"}\ state}$$

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

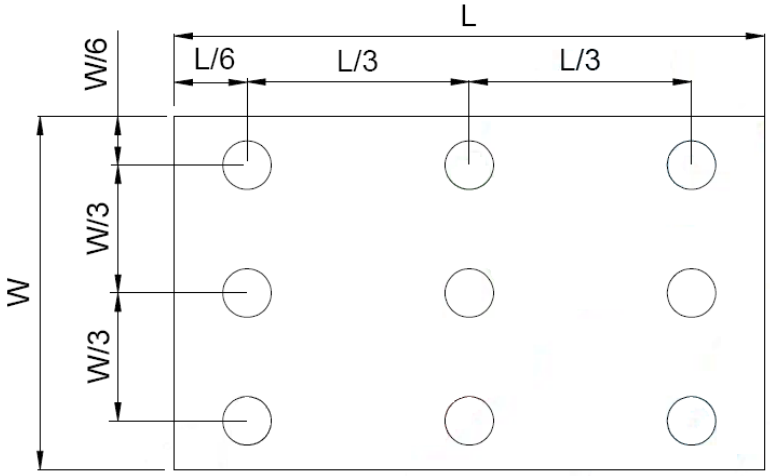
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

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.

$$\text{Luminance Uniformity}(Y_u) = \frac{B_{min}}{B_{max}}$$

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

Pin No	Symbol	I/O	Function	Remark
1	NC	-	No connection	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = “1”, normal operation STBYB = “0”, timing controller, source driver will turn off, all output are GND	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	R[0]~G[0]
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	G[1]~B[1]
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	DE/VS/HS/ B[2]~B[5]
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	R[6]/R[7]/ G[6]/G[7]/ B[6]/ B[7]
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	
27	DIMO	O	Backlight CABC controller signal output	Note1
28	SELB	I	6bit/8bit mode select No	Note2
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note3

34	U/D	I	Vertical inversion N	Note3
35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable pin	Note4
37	CABCEN0	I	CABC H/W enable pin	Note4
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I/O----definition, I----Input, O----Output, P----Power, No used I/O pin please fix to GND level

Note1: PWM output after CABC function;

Note2: LVDS mode 6bits/8bits input select pin. If LVDS input data in 6 bits, SELB must be set to high. If LVDS input data in 8 bits, SELB must be set to low.

Note3: When L/R="0", set right to left scan direction, L/R="1" set left to right scan direction. When U/D="0", set top to bottom scan direction, U/D="1" set bottom to top scan direction.

Note4:

CABC_EN【1：0】 CABC H/W enable pin. Normally pull low.

CABC_EN=”00”, CABC off. (Default mode)

CABC_EN=”01”, user interface image.

CABC_EN=”10”, still picture.

CABC_EN=”11”, moving image.

7. Touch Panel

ITEM	SPECIFICATION
Type	Projective Capacitive Touch Panel
Activation	Multi-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
Conductive susceptibility IEC/EN61000-4-6	10Vrms
Radiated Susceptibility IEC/EN61000-4-3	30V/m
Bonding method	TP module to LCM: Tape bonding

Specify the normal operating condition

(GND=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VIN	4.75	5.0	5.25	V	
Power Consumption	I_{VIN}		T.B.D		mA	

Interface

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

8. 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
Thermal Shock Test	-30°C ~ 80°C 30 m in. ~ 30 min. (1 cycle) Total 100cycle	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 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.

9. General Precautions

9.1 Handling Precautions

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

9.2 Storage precautions

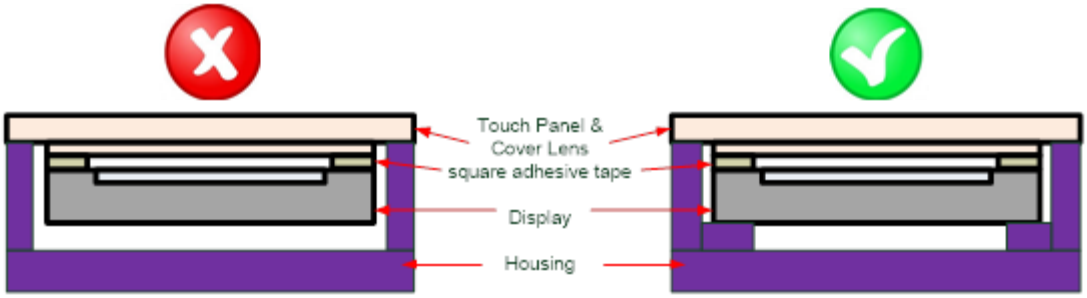
1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
   Temperature : 0℃ ～ 40℃
   Relatively humidity: ≤80%
3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

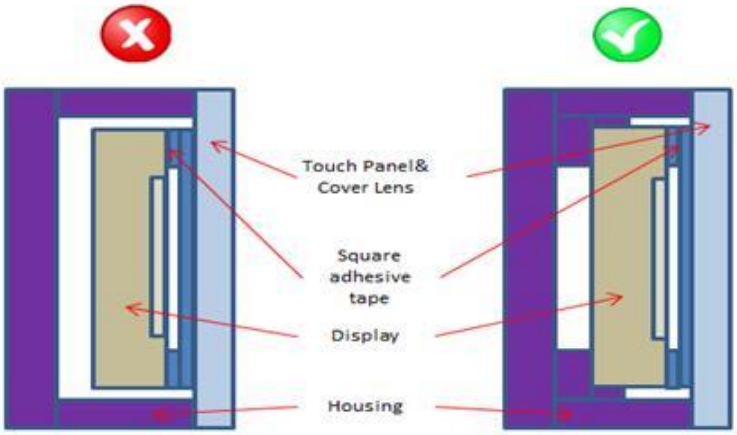
9.3 General Precautions

1. 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.
2. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

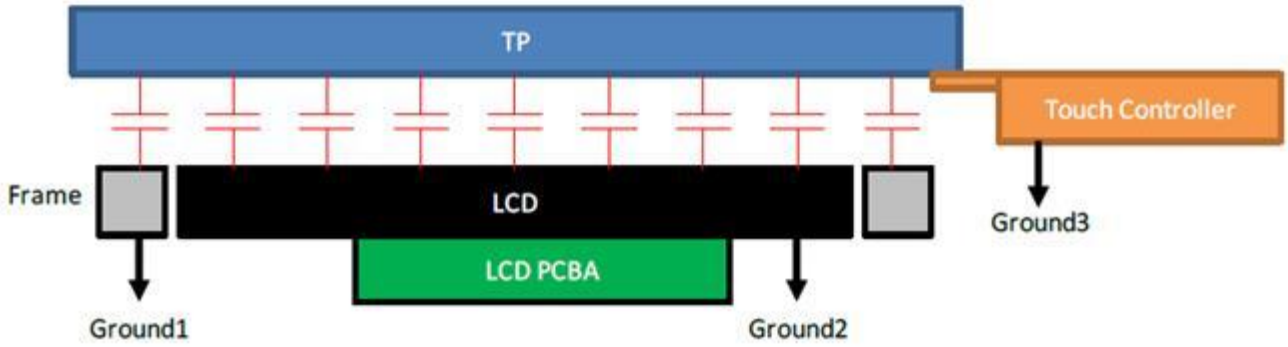
9.4 Mechanism

1. 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.



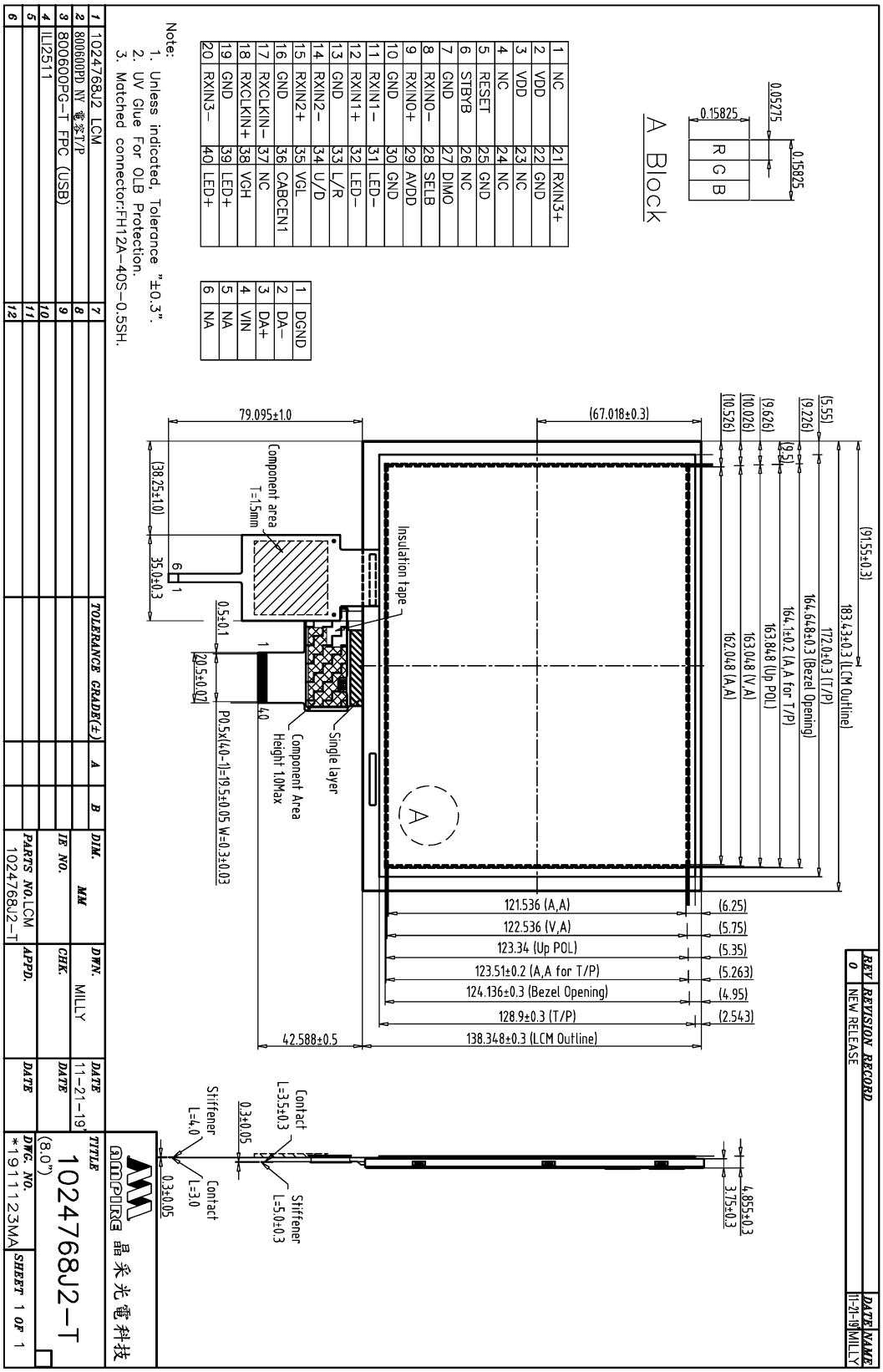


2. TP needs to work in environment with stable stray capacitance. In order to minimize the variation in stray capacitance, all conductive mechanical parts must not be floating. Intermittent floating any conductive part around the touch sensor may cause significant stray capacitance change and abnormal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



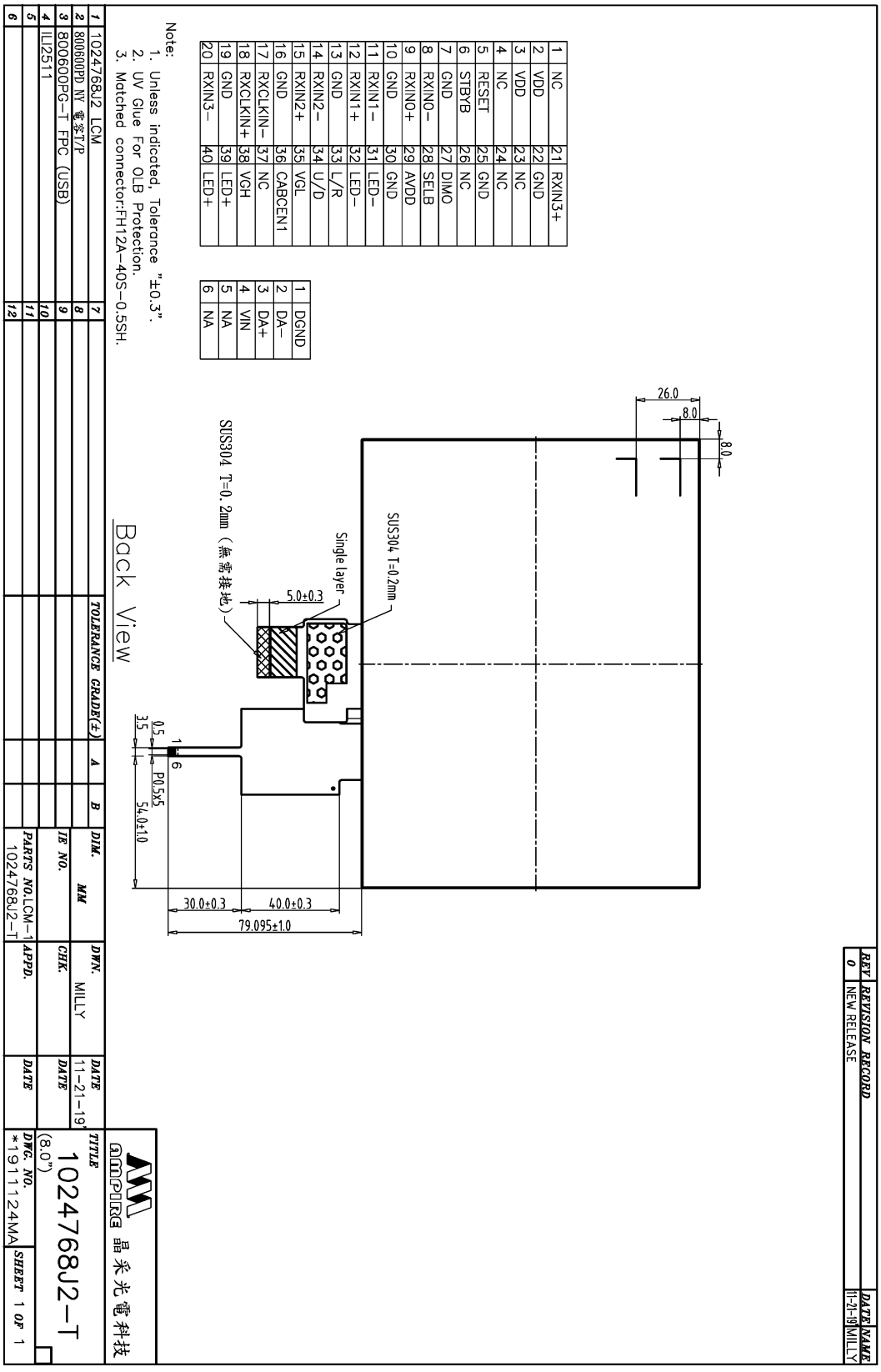
GND1, GND2 and GND3 should be connected together to have the same ground

10. OUTLINE DIMENSION



1	NC	21	RXIN3+
2	VDD	22	GND
3	VDD	23	NC
4	NC	24	NC
5	RESET	25	GND
6	STBYB	26	NC
7	GND	27	DIMO
8	RXIN0-	28	SELB
9	RXIN0+	29	AVDD
10	GND	30	GND
11	RXIN1-	31	LED-
12	RXIN1+	32	LED-
13	GND	33	L/R
14	RXIN2-	34	U/D
15	RXIN2+	35	VGL
16	GND	36	CABCEN1
17	RXCLKIN-	37	NC
18	RXCLKIN+	38	VGH
19	GND	39	LED+
20	RXIN3-	40	LED+

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


REV 0
REVISION RECORD
NEW RELEASE
DATE 11-21-19
NAME MILLY
1 NC
2 VDD
3 VDD
4 NC
5 RESET
6 STBYB
7 GND
8 RXINO−
9 RXINO+
10 GND
11 RXIN1−
12 RXIN1+
13 GND
14 RXIN2−
15 RXIN2+
16 GND
17 RXCLKIN−
18 RXCLKIN+
19 GND
20 RXIN3−
21 RXIN3+
22 GND
23 NC
24 NC
25 GND
26 NC
27 DIMO
28 SELB
29 AVDD
30 GND
31 LED−
32 LED−
33 L/R
34 U/D
35 VGL
36 CABCEN1
37 NC
38 VGH
39 LED+
40 LED+
1 DGND
2 DA−
3 DA+
4 VIN
5 NA
6 NA
Note:
1. Unless indicated, Tolerance "±0.3".
2. UV Glue For OLB Protection.
3. Matched connector:FH12A−40S−0.5SH.
Back View
SUS304 T=0.2mm (無需接地)
Single layer
SUS304 T=0.2mm
5.0±0.3
26.0
8.0
8.0
0.5
3.5
P0.5x5
54.0±1.0
30.0±0.3
40.0±0.3
79.095±1.0
1
6
TOLERANCE GRADE(±)
A
B
DIM. MM
TB NO.
DWN. MILLY
CHK.
APPD.
DATE 11-21-19
DATE
DATE
PARTS NO.LCM-1024768J2-T
TITLE 1024768J2-T (8.0")
DWG. NO. *19111124MA
SHEET 1 OF 1
1024768J2 LCM
800600PD NV 電容T/P
800600PG-T FPC (USB)
ILI2511
晶采光電科技 AMPIRE