



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-12801024B1TMQW-00H
Approved by	
Date	

Approved For Specifications

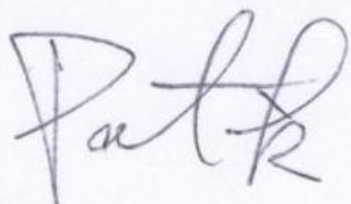


Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2016/11/28	-	New Release	Jessica

1. Features

19.0 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module.
This module is composed of a 19.0" TFT-LCD panel, LCD driver and backlight unit.

2. PHYSICAL SPECIFICATIONS

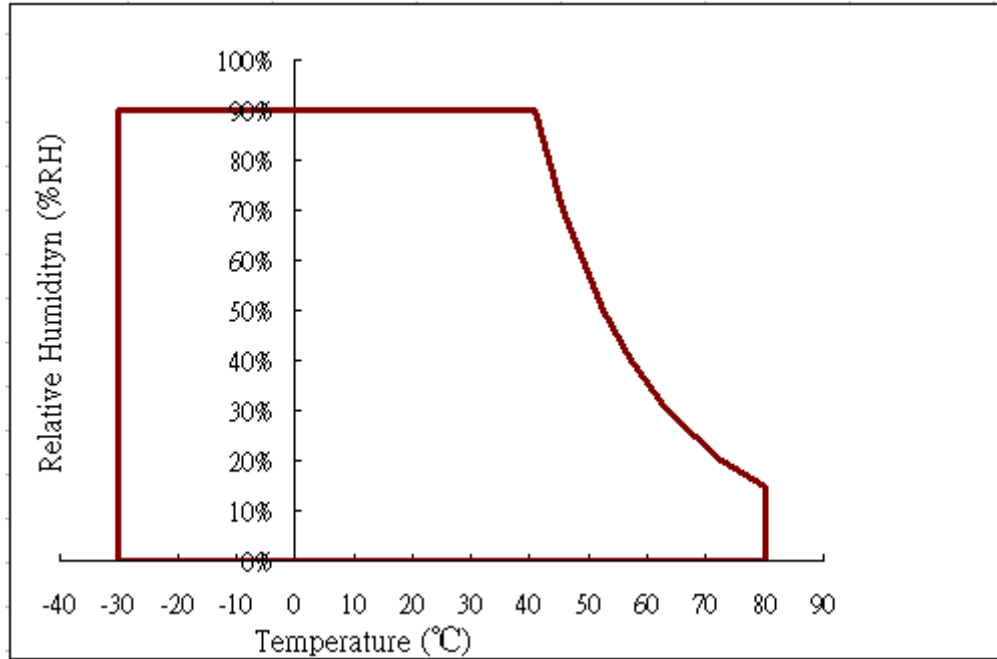
Item	Specifications	Remark
LCD size	19.0 inch(Diagonal)	
Number of Pixels	1280(H) × 1024(V)	
Display mode	Normally white, TN	
Number of Colors	16.7M (6Bit+Hi-FRC)	
Pixel pitch	0.294(W) × 0.294(H)	
Active area	376.32(W) × 301.056(H)	
Module size	396.0 × 324.0 × 15.18 (typ)	
Surface treatment	Anti-Glare, 3H	
Viewing Angle	160 /140(Typ.)	
Backlight	White LED	
Color arrangement	RGB vertical strip	

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage for LCD	VCC	0	6.0	V	
Logic Input Voltage	VI	0	6.0	V	
Operation Temperature	Top	-20	70	°C	1). 2). 3).
Storage Temperature	Tstg	-30	80	°C	1). 2). 3).

[Note]

1). Relative humidity and temperature range are as below sketch, 90%RH Max.



2). The maximum wet bulb temperature $\leq 39^{\circ}\text{C}$ and without dew.

3). If you use the product in an environment which over the definition of temperature and humidity too long to effect the result of eye-etching.

4. ELECTRICAL CHARACTERISTICS

(1).TFT-LCD

ITEM		SYMBOL	MIN	TYP	MAX	UNI	NOTE
LCD Power Voltage		VCC	4.5	5.0	5.5	V	
LCD Power Current		ICC	-	1000	1200	mA	*1)
LCD Rush Current		VCC_Irush			2	A	*3)
Logic Input Voltage (LVDS: IN+,IN-)	Common Voltage	VCM	$\frac{ VID }{2}$	-	$2.4 \cdot \frac{ VID }{2}$	V	Logic Input Voltage (LVDS: +,IN-)
	Differential Input Voltage	VID	200	-	600	mV	
	Threshold Voltage	VTH	-	-	100	mV	
	Threshold Voltage (LOW)	VTL	-100	-	-	mV	
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V		Logic Input Voltage
	VIL	GND	-	0.3*DVDD	V		
Power consumption		P		5	6	W	

【Note】

*1) TYP. specification : Gray-level test Pattern (TYP Freq. @5.0V)

MAX. specification : Black test Pattern (TYP Freq. @5.0V)

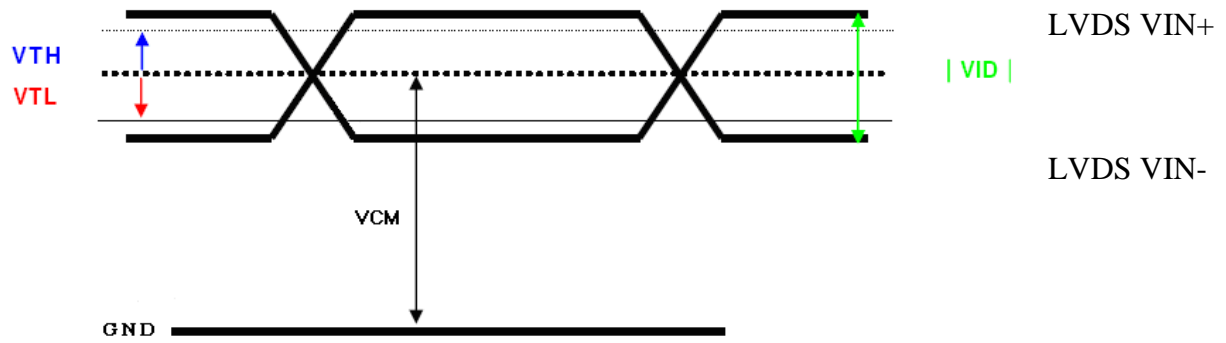


Gray-level Pattern



Black Pattern

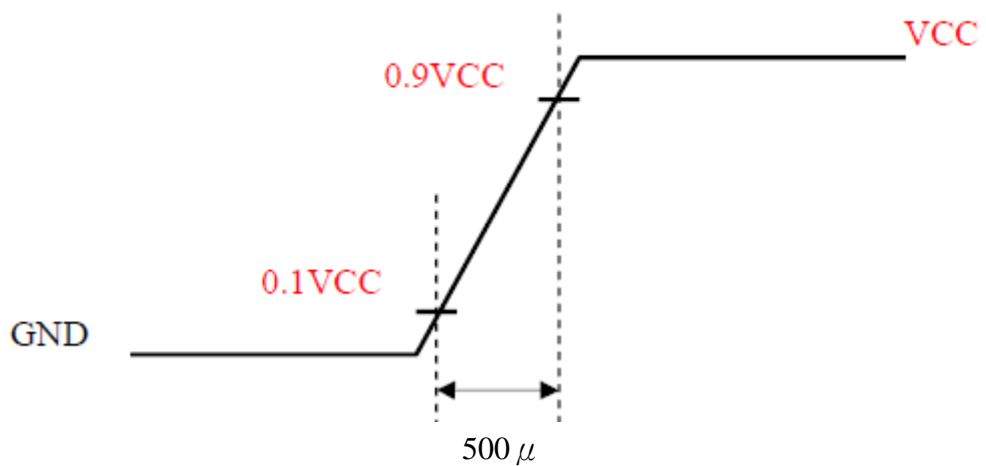
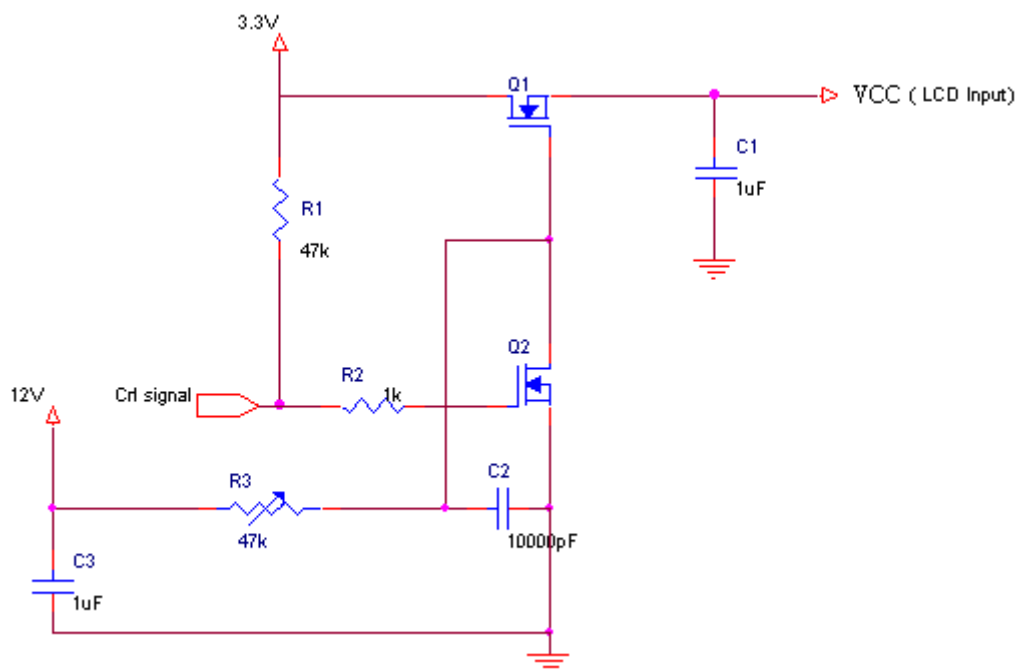
*2) LVDS Signal Definite :



VIN+ : Positive differential DATA & CLK Input

VIN- : Negative differential DATA & CLK Input

*3) Irush measure condition



(2). Power and Signal sequence

Power Sequence :

$$0.50 \text{ ms} \leq T1 \leq 10 \text{ ms}$$

$$0.01 \text{ ms} < T2 \leq 50 \text{ ms}$$

$$0.50 \text{ ms} \leq T4 \leq 10 \text{ ms}$$

$$0.01 \text{ ms} < T10 \leq 50 \text{ ms}$$

$$200 \text{ ms} \leq T3$$

$$10 \text{ ms} \leq T5$$

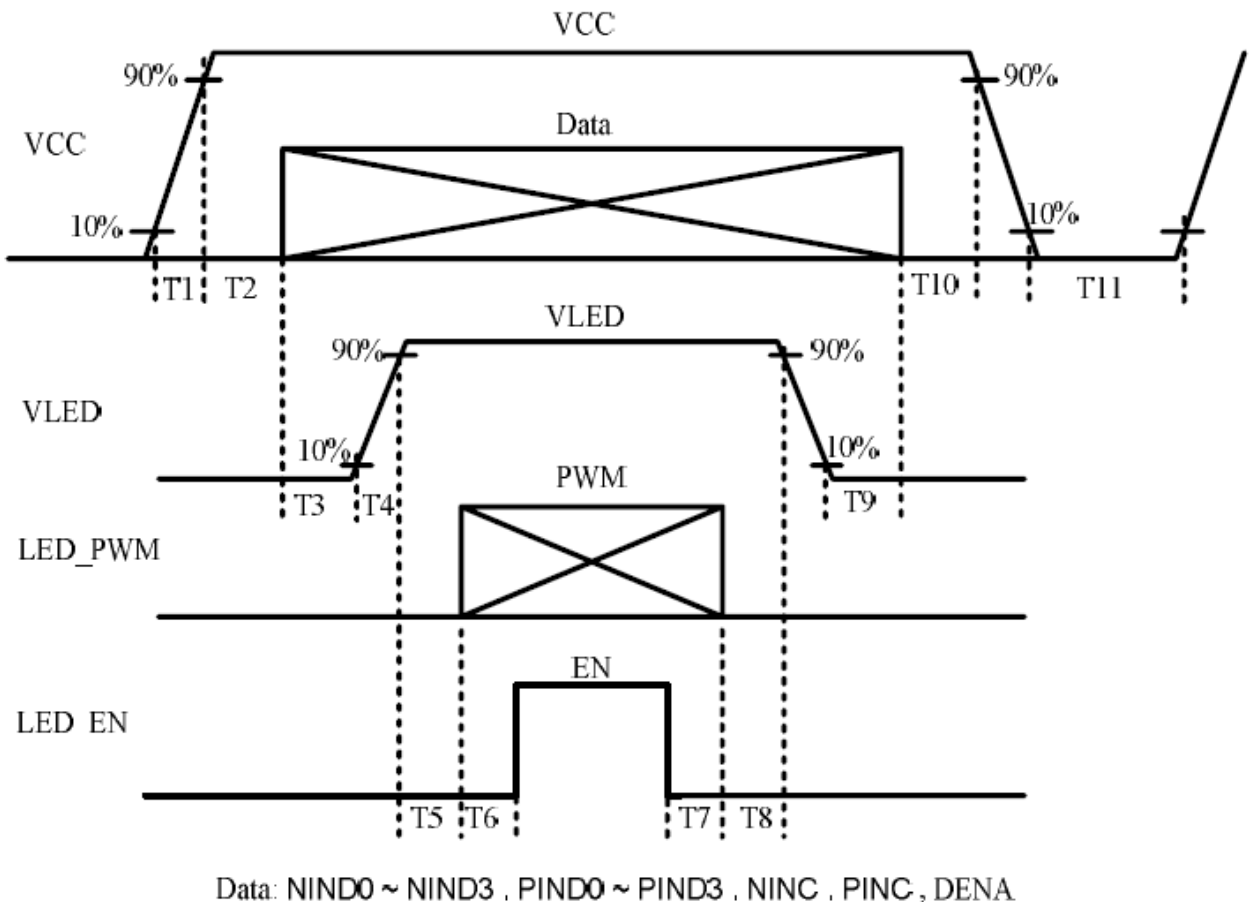
$$10 \text{ ms} \leq T6$$

$$0 \text{ ms} \leq T7$$

$$10 \text{ ms} \leq T8$$

$$200 \text{ ms} \leq T9$$

$$500 \text{ ms} \leq T11$$

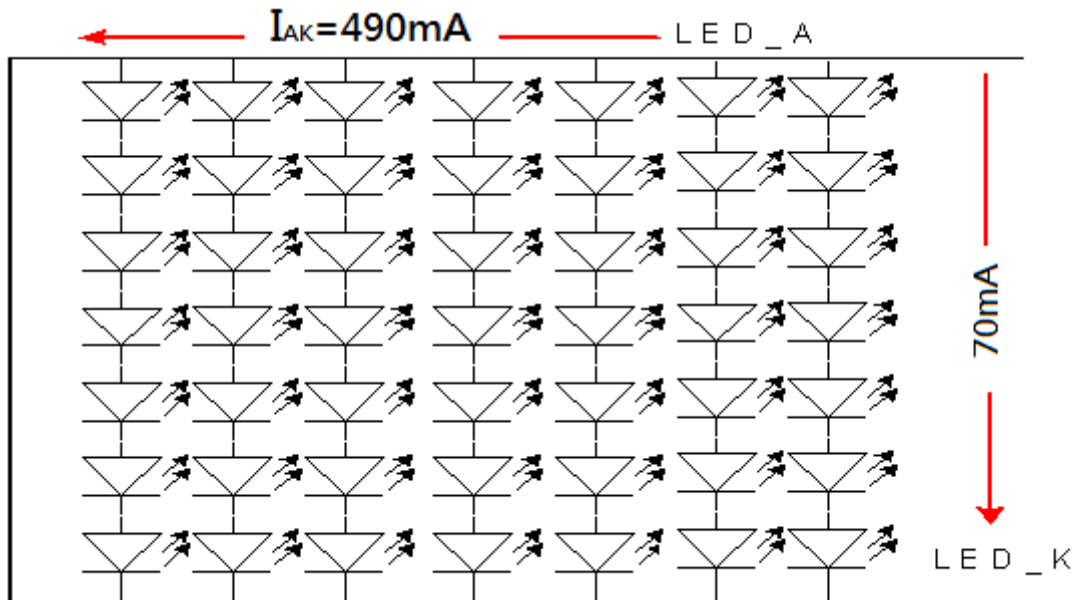


(3). LED Driving Conditions

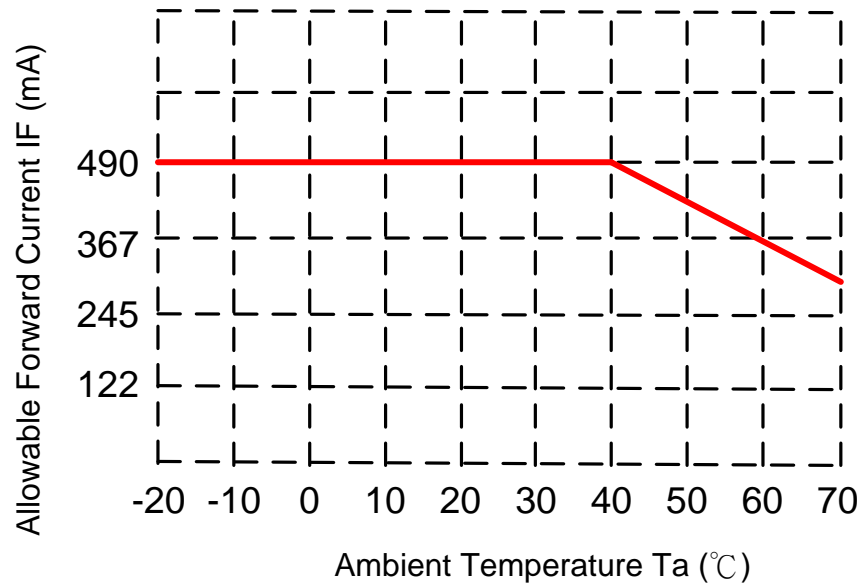
ITEM	SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
LED Backlight Voltage	V_{BL}	--	46.2	--	V	$I_{BL}=490mA$
LED Backlight Current	I_{BL}	-	490	--	mA	Ta=25°C
LED DICE Life Time		--	40K	-	kHr	Note*

Note*: Brightness to be decreased to 50% of the initial value.

Ta=25°C



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



5. INTERFACE PIN CONNECTION

Use connector: CR17-P30RD-2-E1500 (IS NEW CORPORATION) or equivalent (DF14H-30P-1.25H (HRS))

PIN NO.	SYMOBL	FUNCTION
1	RX00-	minus signal of odd channel 0(LVDS)
2	RX00+	plus signal of odd channel 0(LVDS)
3	RX01-	minus signal of odd channel 1(LVDS)
4	RX01+	plus signal of odd channel 1(LVDS)
5	RX02-	minus signal of odd channel 2(LVDS)
6	RX02+	plus signal of odd channel 2(LVDS)
7	GND	ground
8	RXOC-	minus signal of odd clock channel (LVDS)
9	RXOC+	plus signal of odd clock channel (LVDS)
10	RX03-	minus signal of odd channel 3(LVDS)
11	RX03+	plus signal of odd channel 3(LVDS)
12	RXE0-	minus signal of even channel 0(LVDS)
13	RXE0+	plus signal of even channel 0(LVDS)
14	GND	ground
15	RXE1-	minus signal of even channel 1(LVDS)
16	RXE1+	plus signal of even channel 1(LVDS)
17	GND	ground
18	RXE2-	minus signal of even channel 2(LVDS)
19	RXE2+	plus signal of even channel 2(LVDS)
20	RXEC-	minus signal of even clock channel (LVDS)
21	RXEC+	plus signal of even clock channel (LVDS)
22	RXE3-	minus signal of even channel 3(LVDS)
23	RXE3+	plus signal of even channel 3(LVDS)
24	GND	ground
25	GND	ground
26	GND	ground
27	GND	ground
28	VCC	Power supply input voltage(5.0 V)
29	VCC	Power supply input voltage(5.0 V)
30	VCC	Power supply input voltage(5.0 V)

- 1) Please keep the NC Pin and don't connect it to GND or other signals.
- 2) GND Pin must connect to the ground, don't let it be a vacant pin.

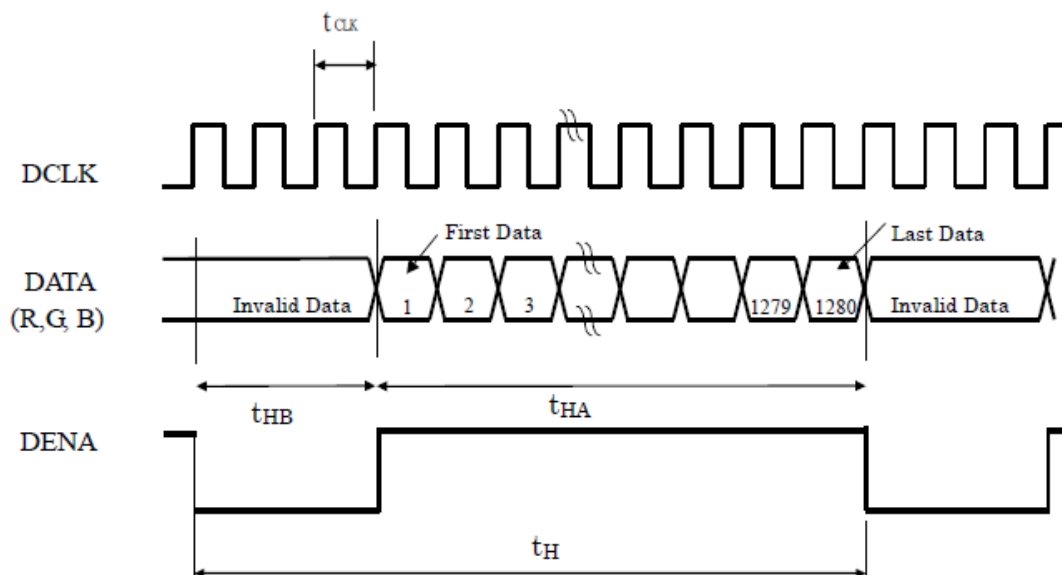
6. INTERFACE TIMING

(1) Timing Specifications

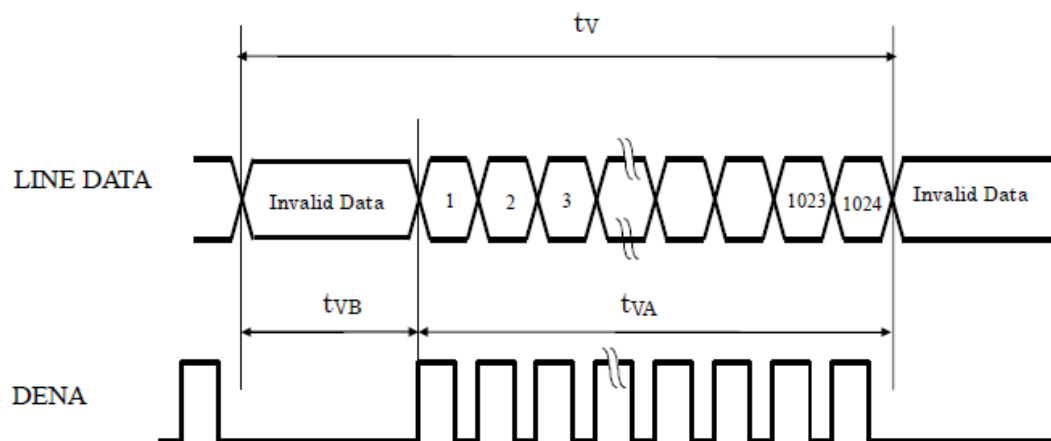
ITEM		SYMBOL	MIN	TYP	MAX	UNIT	
LCD Timing	DCLK	Frequency	fCLK	44	54	67.5	MHz
		Period	tCLK	14.81	18.52	22.2	ns
	DATA Enable DENA	Horizontal Active	tHA	640			tCLK
		Horizontal Blank	tHB	140	204	-	tCLK
		Horizontal Total Time	tH	780	844	2047	tCLK
		Vertical Active Time	tVA	1024			tH
		Vertical Blank Time	tVB	8	42	126	tH
		Vertical Total Time	tV	1032	1066	1150	tH
Vertical Frame Rate	Fr	50	60	75	Hz		

(2) Timing Chart

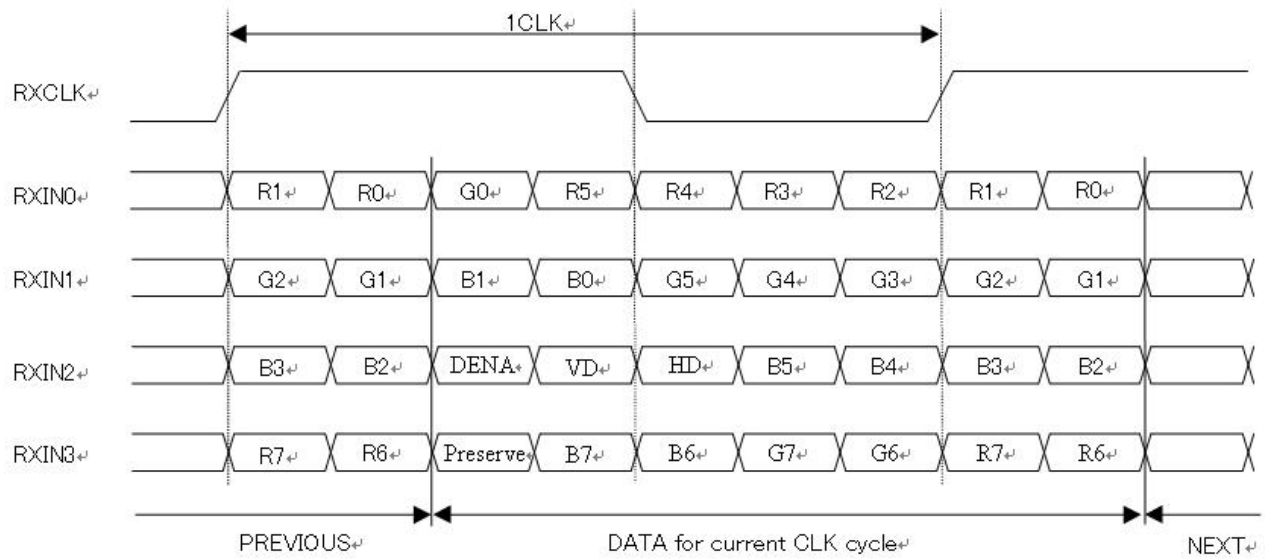
a. Horizontal Timing



b. Vertical Timing



(3) LVDS DATA (VESA) : Timing Chart



(4) Color Data Assignment

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	
	RED(255)	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	1	1	1	1	1	1	1	1	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	
	CYAN	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	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	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	
RED	RED(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)	0	0	0	0	0	0	1	0	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(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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GREEN	GREEN(0)	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	1	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		
	GREEN(254)	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	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
BLUE	BLUE(0)	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	1	0	
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	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	

[Note]

1) Definition of gray scale:

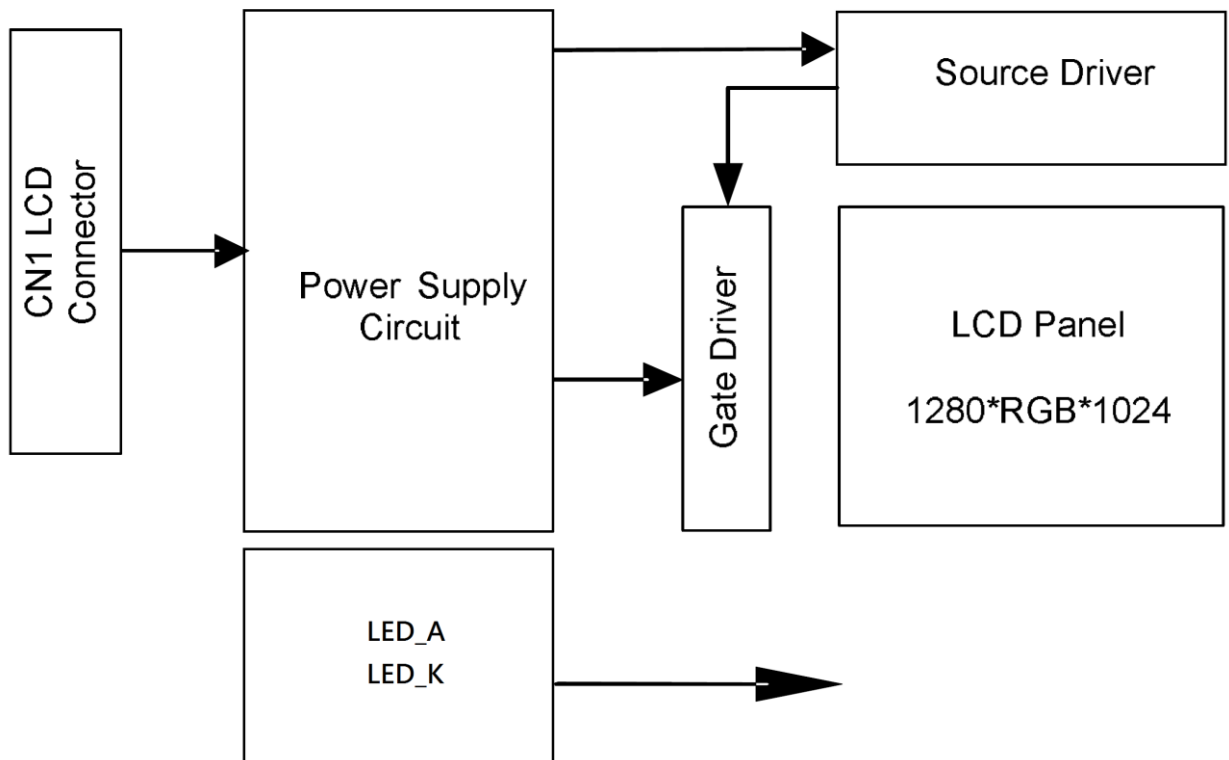
Color (n): n indicates gray scale level; higher n means brighter level.

2) Data: 1-High, 0-Low.

3) This assignment is applied to both odd and even data.

7. BLOCK DIAGRAM

TFT- LCD Module



8. OPTICAL CHARACTERISTICS

Ta=25°C , VCC=3.3

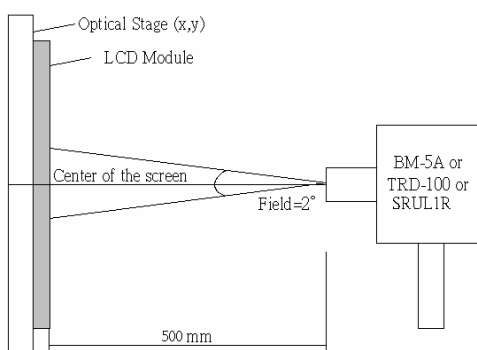
ITEM	SYMBOL	CONDITION	min	typ	max	UNIT	REMARK	
Contrast Ratio	CR	$\theta = \phi = 0^\circ$	600	1000	--	--	*1) 2)	
Luminance(CEN)	L	$\theta = \phi = 0^\circ$	800	1000	--	cd/m ²	*1) 3)	
9P Uniformity	ΔL	$\theta = \phi = 0^\circ$	75	80	--	%	*1) 3)	
Response Time	Tr+ Tf	$\theta = \phi = 0^\circ$	--	16	--	ms	*5)	
Crosstalk	CT	$\theta = \phi = 0^\circ$	--	--	--	%	*6)	
Viewing Angle	Horizontal	ϕ	CR \geq 10	-70~70	-80~80	--	Deg.	*4)
	Vertical	θ		-60~60	-70~70	--		
Color Coordinates	White	X Y	$\theta = \phi = 0^\circ$	(0.263) (0.279)	(0.313) (0.329)	(0.363) (0.379)	*3)	
	Red	X Y		TBD	TBD	TBD		
	Green	X Y		TBD	TBD	TBD		
	Blue	X Y		TBD	TBD	TBD		
Gamut	CG	$\theta = \phi = 0^\circ$	--	72	--	--	--	
Gamma	γ	VESA	2	2.2	2.4	--	*7)	
Image Sticking	Tis	4hr			5	min	*8)	

[Note]

Definition of these measurement items is as follows:

1) Setup of Measurement Equipment

The LCD module should be turn-on to a stable luminance level to be reached. The measurement should be executed after lighting Backlight for 20 minutes and in a dark room.



2).Definition of Contrast Ratio:

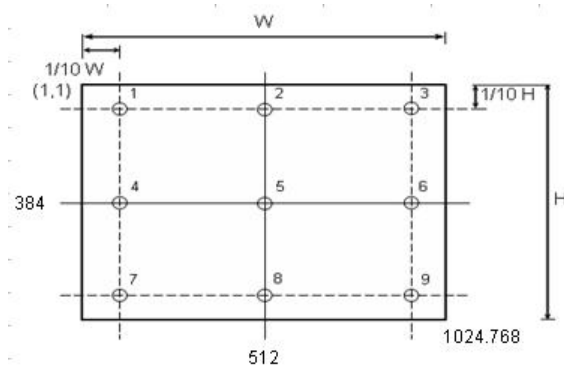
CR=ON (White) Luminance/OFF (Black) Luminance.

3).Definition of Luminance and Luminance uniformity:

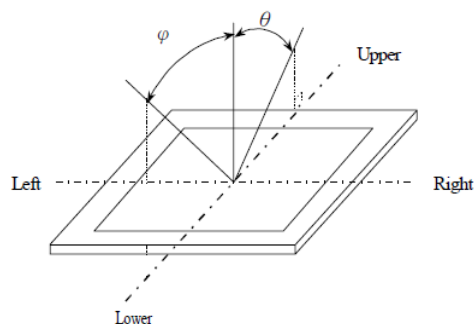
Center Luminance &Color coordinate: measuring the luminance of the point no. 5

Average Luminance: measuring average luminance of points no.1-no.9

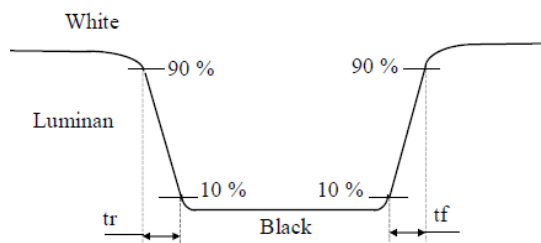
Uniformity: $\Delta L = [L (\text{Min})/L (\text{Max})] \times 100 \%$



4).Definition of Viewing Angle (θ , ϕ):



5) Definition of Response Time:

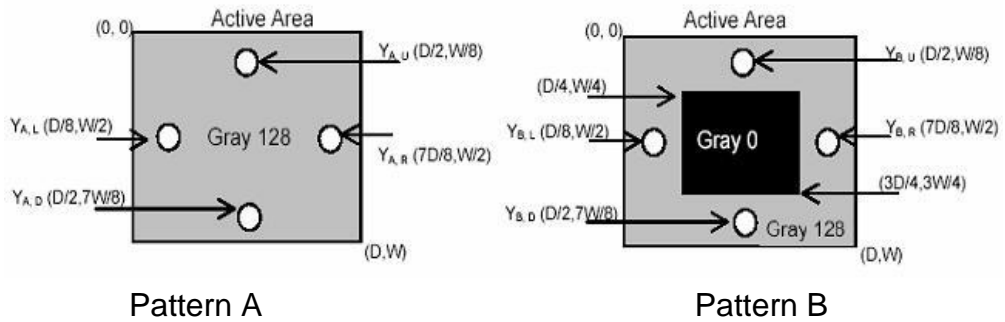


6) Definition of crosstalk:

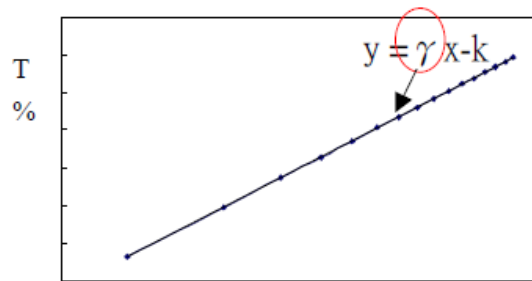
$$CT = | Y_B - Y_A | / Y_A \times 100 (\%)$$

Y_A : The luminance of measured position at pattern A

Y_B : The luminance of measured position at pattern B with Gray level 0



7) Definition of Gamma (γ), follow VESA standard sampling every 16 gray level (0, 16, 32~224,240,255)



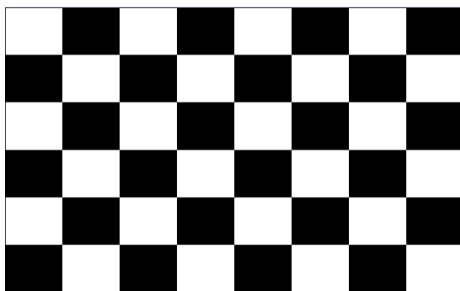
Gray level (LOG)

8) Image Sticking:

Condition of image sticking test: 25°C

Operation with test pattern sustained for 4hrs, then change to gray pattern immediately.

After 5 min, the Mura must be disappeared completely.



(a) Test Pattern (Chess Board Pattern)



(b) judgment Pattern (128 Gray Pattern)

9. RELIABILITY TEST CONDITIONS

(1) Temperature and Humidity

TEST ITEMS	CONDITIONS	REMARK
High Temperature High Humidity Operation	50°C ; 80%RH; 240hrs (No condensation)	
High Temperature Operation	70°C ; 240hrs	
High Temperature Storage	80°C ; 240hrs	
Low Temperature Operation	-20°C ; 240hrs	
Low Temperature Storage	-30°C ; 240hrs	
Thermal Shock	Between -20°C (0.5hr) ~ 60°C (0.5hr); 50 Cycles	

(2) Shock & Vibration

ITEMS	CONDITIONS
SHOCK (NON-OPERATION)	Shock level: (50 G) Waveform: half sinusoidal wave, 20ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs
VIBRATION (NON-OPERATION)	Acceleration:1.5G Waveform: Random Frequency :10~200~10Hz Sweep:30Minute each Axis(X,Y,Z)

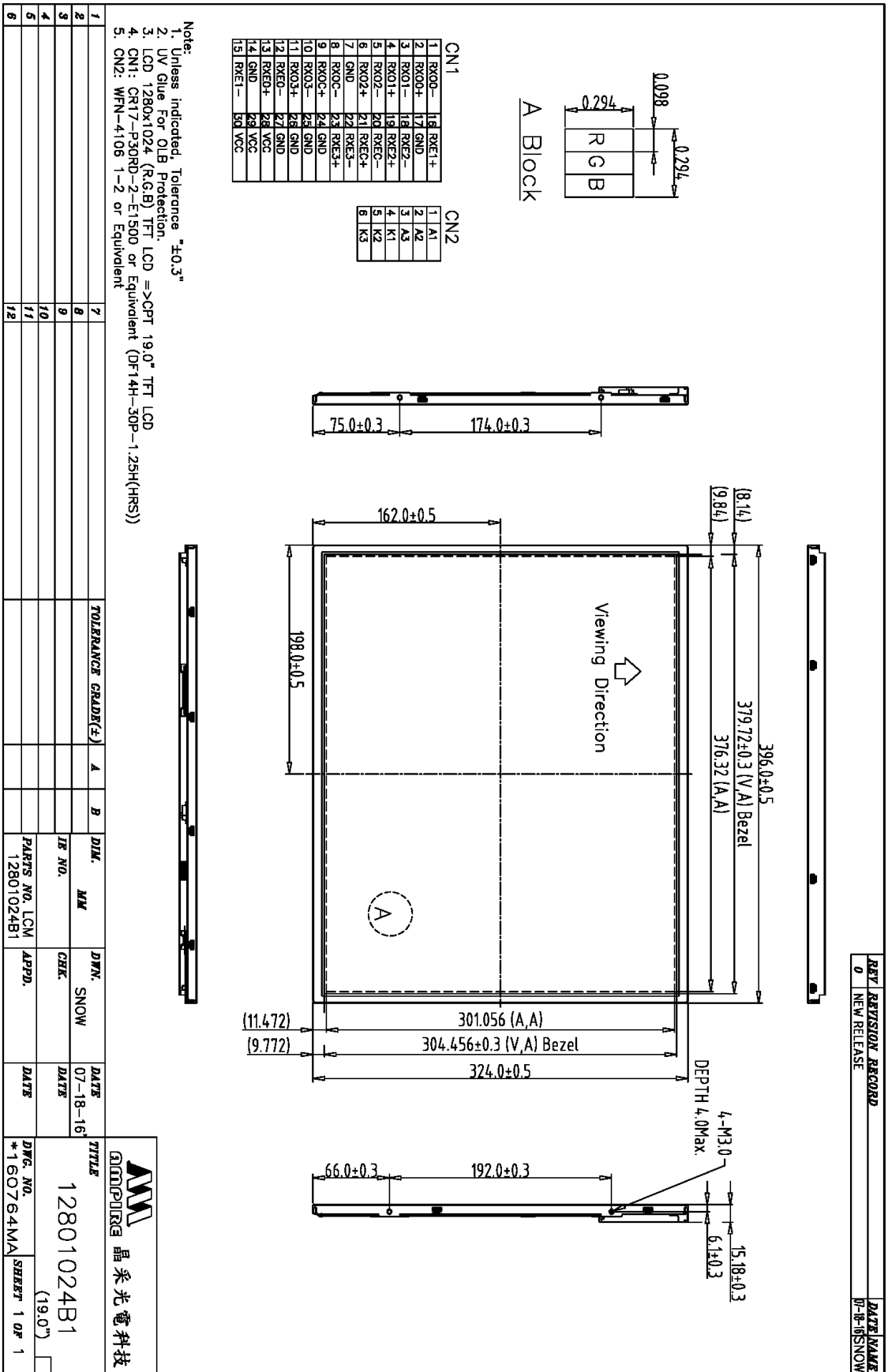
(3) ESD

POSITION	CONDITION(MDL turn off)
Connector	1. 200 pF , 0 Ω , ±200 V 2. contact mode for each pin
Module	1. 150 pF , 330 Ω , ±15K V (Air mode) , ±8K V (Contact mode) 2. Air mode, test 25 times for each test point 3. Contact mode, 25 times for each test point

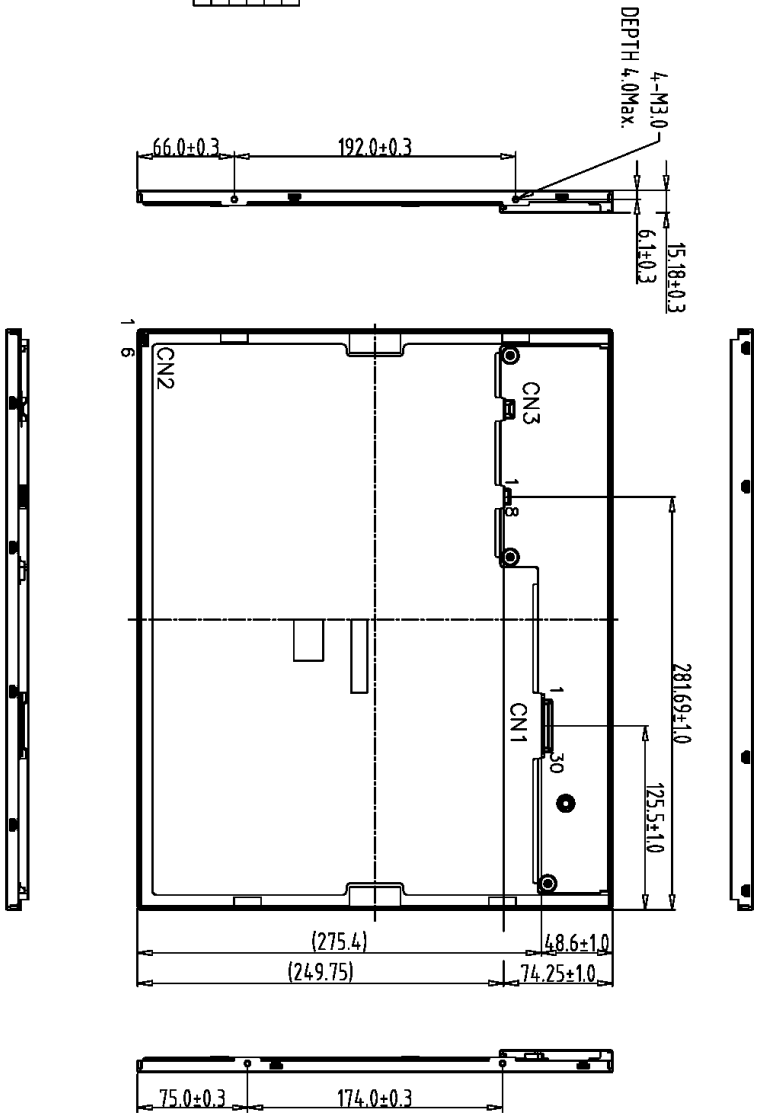
(4) Judgment standard

The judgment of the above test should be made as follow: Pass: Normal display image with no line defect.
Fail: No display image or line defects

10. OUTLINE DIMENSION



REV	REVISION RECORD	DATE NAME
0	NEW RELEASE	P-18-16SNOW



CN1

1	RX00-	18	RXE1+
2	RX00+	17	GND
3	RX01-	18	RXE2-
4	RX01+	18	RXE2+
5	RX02-	20	RXE0-
6	RX02+	21	RXE0+
7	GND	22	RXE3-
8	RX0C-	23	RXE3+
9	RX0C+	24	GND
10	RX03-	25	GND
11	RX03+	26	GND
12	RX00-	27	GND
13	RX00+	28	VCC
14	GND	29	VCC
15	RXE1-	30	VCC

CN2

1	A1
2	A2
3	A3
4	K1
5	K2
6	K3

Back view

- Note:
1. Unless indicated, Tolerance ± 0.3 "
 2. UV Glue For OLB Protection.
 3. LCD 1280x1024 (R.G.B) TFT LCD =>CPT 19.0" TFT LCD
 4. CN1: CR17-P30RD-2-E1500 or Equivalent (DF14H-30P-1.25H(HRS))
 5. CN2: WFN-4106 1-2 or Equivalent

1	2	TOLERANCE GRAD(E)	A	B	DIM.	MM	DWN.	SNOW	DATE	TITLE
8	9				IE NO.		CHK.		DATE	MM AMPIRE 晶采光電科技 12801024B1 (19.0")
10	11				PARTS NO. LCM-1		APPD.		DATE	
12	13				12801024B1				DATE	
14	15								DATE	
16	17								DATE	
18	19								DATE	
										DWG. NO. *160765MA SHEET 1 OF 1