

## 产品规格书

Product Type: 7" TFT LCD Module

LCD Number: CLAG070NJ01

XLX Module No.: LXJD070WHM280-18A

CUSTOMER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
<hr/>			
SUPPLIER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
	杨浩		

# 香港鑫联鑫科技有限公司

## Contents

# 香港鑫联鑫科技有限公司

## Document Revision History

# 香港鑫联鑫科技有限公司

## 1.0 General Description

CLAP070NJ01CW is 7.0" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) OLB module (finish outer lead bonding) composed of LCD panel and driver ICs (the backlight is not included in this OLB module).

The 7.0" screen produces 1024(\*3)X600 WSVGA resolution image. By applying R.G.B. input signal, full color images are displayed.

General specifications are summarized in the following table: ROHS design

### 1.1. General information

Item	Specification	Unit
Outline Dimension	164.9 (H) x 100 (V) x2.8 (D)	mm
Display area	154.2144 (H) × 85.92 (V)	mm
Number of Pixel	1024(H) × 3(RGB) × 600(V)	pixels
Pixel pitch	0.1506(H) × 0.1432(V)	mm
Pixel arrangement	RGB Vertical stripe	
Number of color	16.7M	
Response Time (Tr+Tf)	25ms (typ.)	
Viewing Direction	6 o'clock (Max. Contrast, Gray level inversion)	
Color Filter Array	RGB vertical strip	
Surface Treatment	Anti-Glare, Hardness:3H	

# 香港鑫联鑫科技有限公司

## 2.0 Absolute Maximum Ratings

### 2.1 TFT LCD Module

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Item	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	DVDD	-0.3	3.96	V	-
Analog Supply Voltage	AVDD	-0.5	14.85	V	-
Gate On Voltage	VGH	-0.3	40	V	-
Gate Off Voltage	VGL	-20	0.3	V	-
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	-
Operating Temperature	Topa	-10	60	°C	Note1
Storage Temperature	Tstg	-20	70	°C	Note1

Note1 : If users use the product out off the environmental operation range ( temperature and humidity), it will have visual quality concerns.

Note1: If users use the product out off the environmental operation range (temperature and humidity) , it will have visual quality concerns.

### 2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-10	60	°C	
Storage Temperature	Tstg	-20	70	°C	

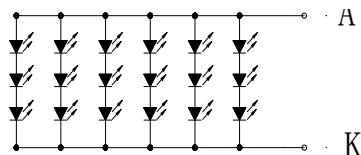
### 2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	-	100	-	mA	-	-
LED Voltage (Total)	VF	9	9.9	10.5	V	-	-
Life Time		-	25000	-	Hr.	$I \leq 140mA$	-
Color						White	

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2)  $T_a=25\pm 2^{\circ}\text{C}$

(3) Test condition: LED Current 120mA



LED电路图

# 香港鑫联鑫科技有限公司

## 3.0 Optical Characteristics

### 3.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max	Unit
Panel Transmittance	-	-	3. 9	4. 2	-	%
LCM luminance (Center)	Y <sub>L</sub>	I=120mA	160	180	-	cd/m <sup>2</sup>
Contrast	CR		600	800	-	-
Response time	Rising	T <sub>R</sub>	Point-5	—	20	40
	Falling	T <sub>F</sub>				
Color chromaticity	White	W <sub>X</sub>		0. 28	0. 30	0. 33
		W <sub>Y</sub>		0. 30	0. 32	0. 35
Viewing angle	Left	φ	Point-5 CR≥10	70	80	°
	Right	φ		70	80	°
	Upper	θ		50	60	
	Lower	θ		60	70	

### 3.2 Measuring Condition

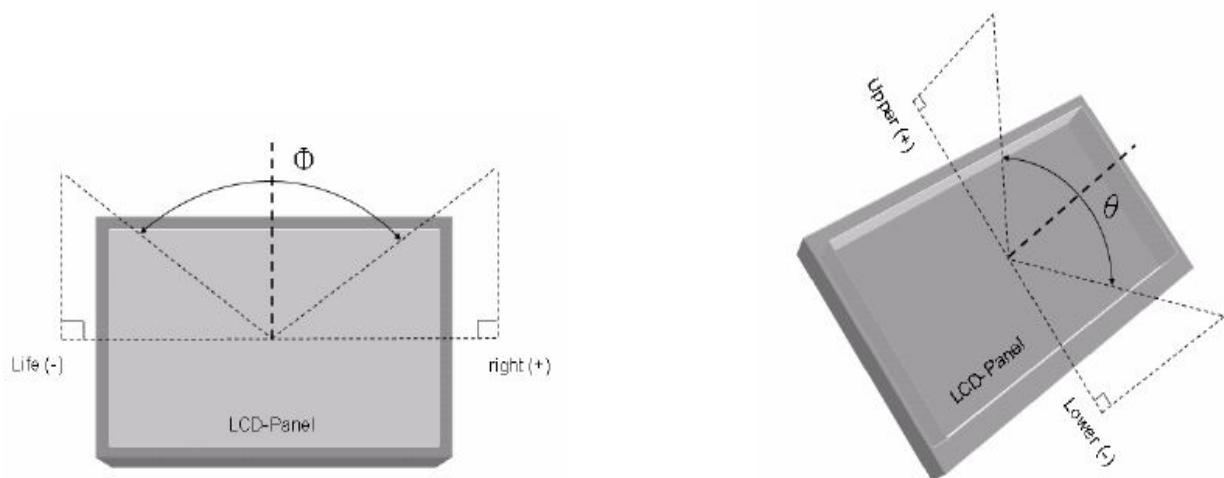
- Measuring surrounding : dark room
- Ambient temperature : 25±2°C
- The measured value of luminace and color coordinate bases BM-7

### 3.3 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

# 香港鑫联鑫科技有限公司

**Note (1)** Definition of Viewing Angle :

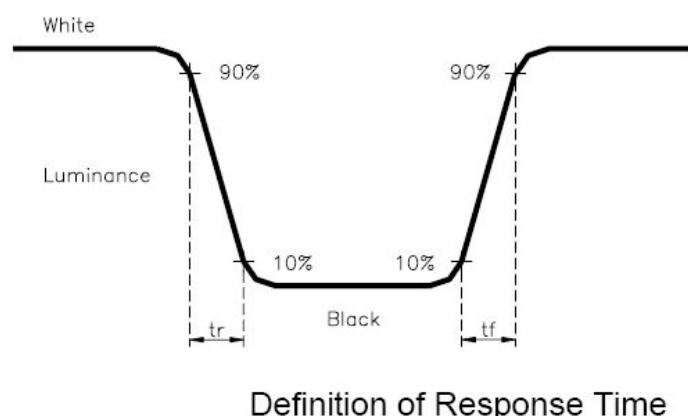


**Note (2)** Definition of Contrast Ratio(CR) :

measured at the center point of panel

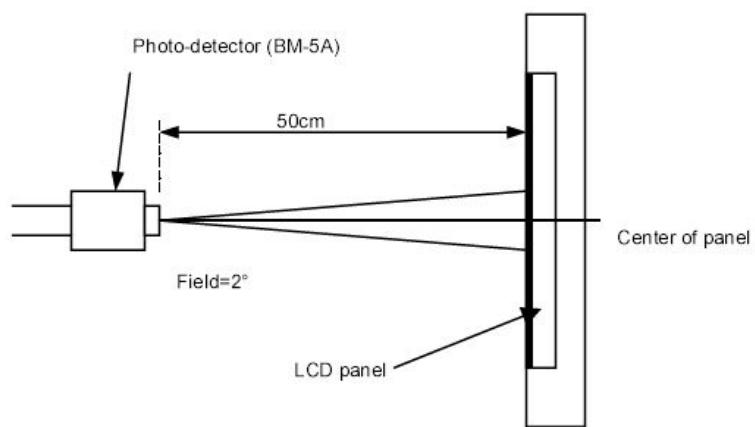
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

**Note (3)** Definition of Response Time : Sum of Tr and Tf

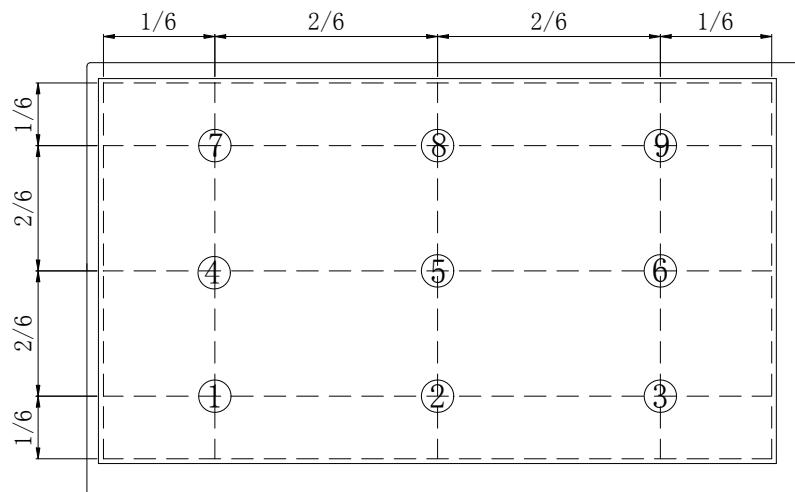


# 香港鑫联鑫科技有限公司

**Note (4)** Definition of optical measurement setup



**Note (5)** Definition of brightness uniformity



# 香港鑫联鑫科技有限公司

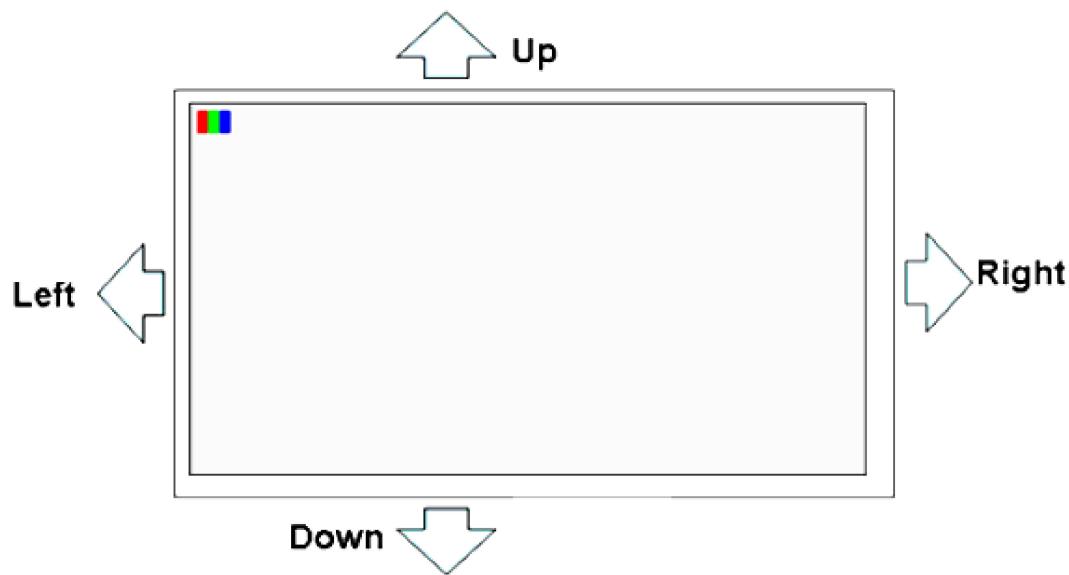
## 4.0 Interface Pin Connection

Pin NO.	SYMBOL	DESCRIPTION
1	LED+	LED Anode
2	LED+	LED Anode
3	LED-	LED Cathode
4	LED-	LED Cathode
5	GND	Ground
6	VCOM	Common Voltage
7	DVDD	Digital Power
8	MODE	DE/SYNC Mode Select. Normally Pull High H: DE mode. L: HSD/VSD mode
9	DEN	Data Enable signal
10	VSD	Vertical sync input. Negative polarity
11	HSD	Horizontal sync input. Negative polarity
12	B7	Blue Data Input(MSB)
13	B6	Blue Data Input
14	B5	Blue Data Input
15	B4	Blue Data Input
16	B3	Blue Data Input
17	B2	Blue Data Input
18	B1	Blue Data Input
19	B0	Blue Data Input(LSB)
20	G7	Green Data Input(MSB)
21	G6	Green Data Input
22	G5	Green Data Input
23	G4	Green Data Input
24	G3	Green Data Input
25	G2	Green Data Input
26	G1	Green Data Input
27	G0	Green Data Input(LSB)
28	R7	Red Data Input(MSB)
29	R6	Red Data Input
30	R5	Red Data Input
31	R4	Red Data Input
32	R3	Red Data Input
33	R2	Red Data Input
34	R1	Red Data Input
35	R0	Red Data Input(LSB)
36	GND	Power Ground
37	DCLK	Clock Input
38	GND	Power Ground
39	SHLR	Left or Right Display Control
40	UPDN	Up / Down Display Control
41	VGH	Positive Power for TFT
42	VGL	Negative Power for TFT
43	AVDD	Analog Power
44	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. ( $R=10K\Omega$ , $C=1\mu F$ )
45	NC	Not Connect
46	VCOM	Common Voltage
47	DITH	Dithering setting DITH="H" 6bit resolution(last 2 bit of input data truncated) DITH="L" 8bit resolution(default setting)
48	GND	Power Ground
49	NC	Not Connect
50	NC	Not Connect

# 香港鑫联鑫科技有限公司

\*2)UPDN and SHLR control function

UPDN	SHLR	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down



# 香港鑫联鑫科技有限公司

## 5. Electrical Characteristics

### 5.1 Typical operation conditions

T<sub>a</sub>=25°C

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	DVDD	3	3.3	3.6	V	-
Analog Power Supply Voltage	AVDD	9.4	9.6	9.8	V	-
Gate On Power Supply Voltage	VGH	17	18	19	V	-
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	-
Common Power Supply Voltage	VCOM	3.4	3.9	4.4	V	Note1
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	-
	VIL	GND	-	0.3*DVDD	V	

【Note1】Please adjust VCOM to make the flicker level be minimum.

### 5.2 Current consumption

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX	UNIT	NOTE
Gate on power current	IVGH	VGH =18V	--	0.5	1	mA	Note1
Gate off power current	IVGL	VGL= -6V	--	0.5	1	mA	Note1
Digital power current	IDVDD	DVDD = 3.3V	--	30	45	mA	Note1
Analog power current	IAVDD	AVDD = 9.6V	--	35	45	mA	Note1
Total Power Consumption	PC		--	447	604	mW	Note1

Note1: Typ. specification : Gray-level test Pattern

Max. specification : Black test Pattern



256 gray pattern



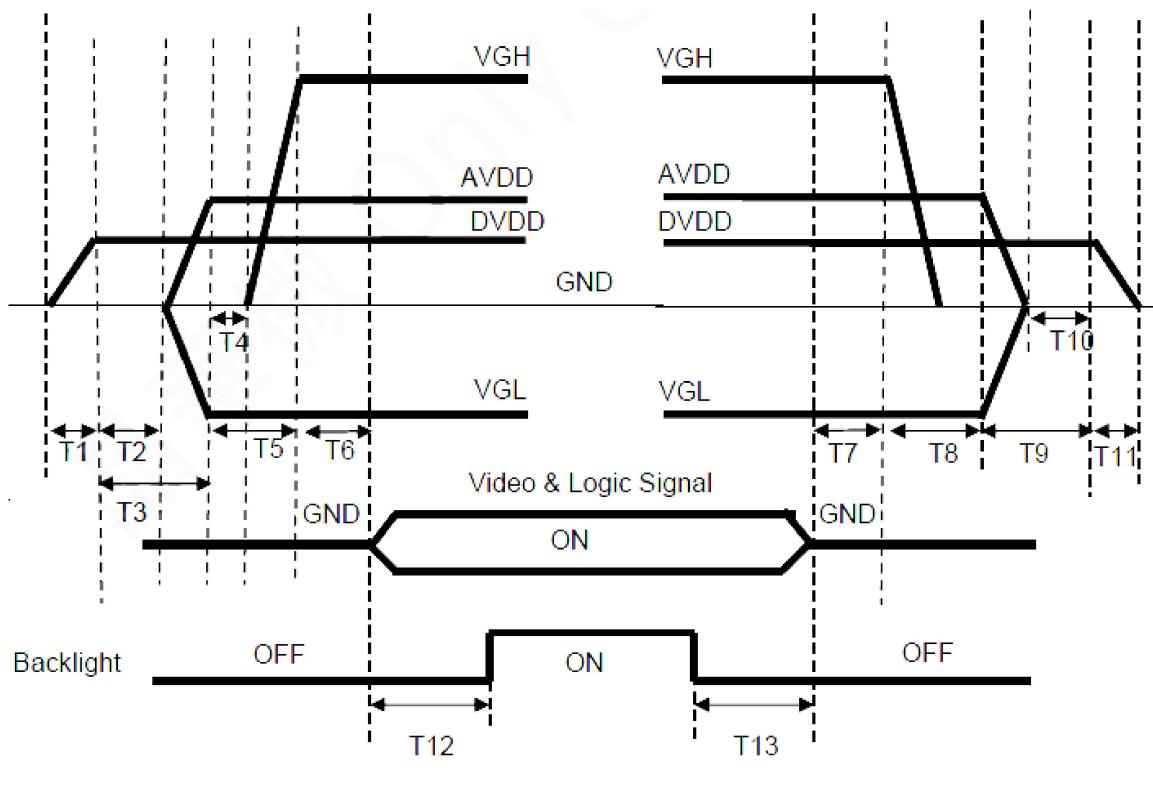
Black Pattern

# 香港鑫联鑫科技有限公司

## 5.3 Power、Signal sequence

Power On: DVDD\_AVDD/VGL\_VGH\_Video & Logic Signal→Backlight

Power Off: Backlight→Video & Logic Signal\_VGH\_AVDD/VGL\_DVDD



# 香港鑫联鑫科技有限公司

## 5.4 Timing characteristics of input signals

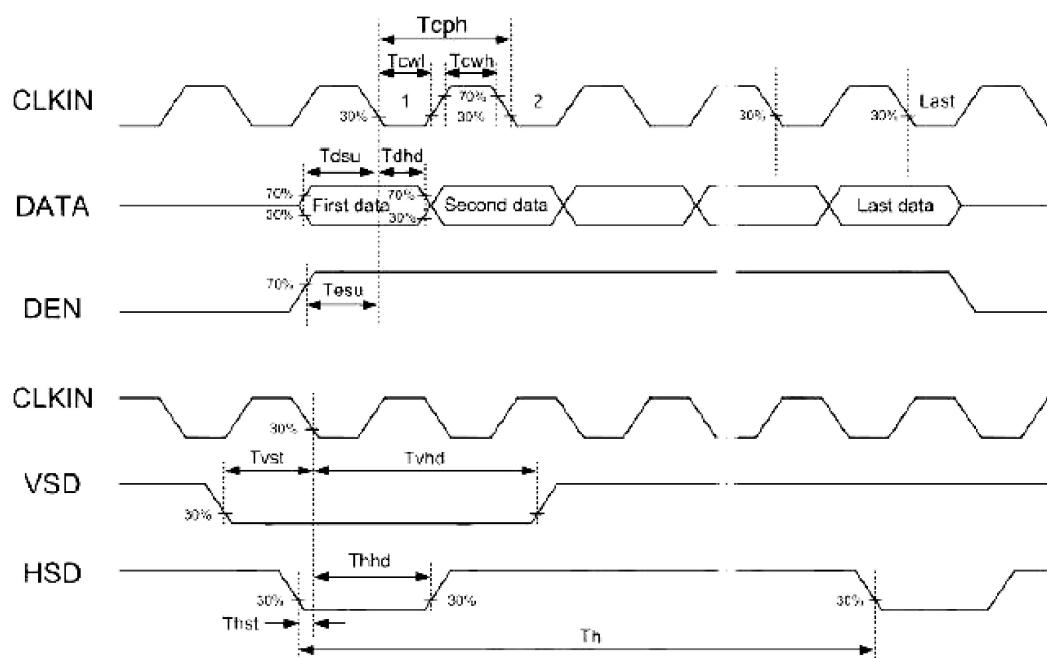
### 5.4.1. InputTimingTable

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DE MODE	Dot Clock	1/tCLK	45	51.2	57	MHz
	DCLK Pulse Duty	Tcwh	40	50	60	%
	Horizontal Total Time	tH	1324	1344	1364	tCLK
	Horizontal Effective Time	tHA		1024		tCLK
	Horizontal Blank Time	tHB	300	320	340	tCLK
	Vertical Total Time	tV	625	635	645	tH
	Vertical Effective Time	tVA		600		tH
	Vertical Blank Time	tVB	25	35	45	tH
SYNC MODE	Horizontal Total Time	TH	1324	1344	1364	tCLK
	Horizontal Pulse Width	Thpw		20	-	tCLK
	Horizontal Back Porch	Thb		140	-	tCLK
	Horizontal Front Porch	Thfp	140	160	180	tCLK
	Horizontal Effective Time	THA		1024		tCLK
	Vertical Total Time	TV	625	635	645	tH
	Vertical Pulse Width	Tvpw		3	-	th
	Vertical Back Porch	Tvb	-	20	-	th
	Vertical Front Porch	Tvfp	2	12	22	th
	Vertical Valid	Tvd		600		th

### 5.4.2 Input Clock and Data Timing Diagram

# 香港鑫联鑫科技有限公司

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
DVDD Power On Slew Rate	TPOR	-	-	20	ms	From 0V to 90% DVDD
RSTB Pulse Width	TRst	50	-	-	us	DCLK=65MHz
DCLK Cycle Time	Tcph	14	-	-	ns	
DCLK Pulse Duty	Tcwh	40	50	60	%	
VSD Setup Time	Tvst	5	-	-	ns	
VSD Hold Time	Tvhd	5	-	-	ns	
HSD Setup Time	Thst	5	-	-	ns	
HSD Hold Time	Thhd	5	-	-	ns	
Data Setup Time	Tdsu	5	-	-	ns	D0[7:0],D1[7:0],D2[7:0] to DCLK
Data Hold Time	Tdhd	5	-	-	ns	D0[7:0],D1[7:0],D2[7:0] to DCLK
DEN Setup Time	Tesu	5	-	-	ns	
DEN Hold Time	Tehd	5	-	-	ns	

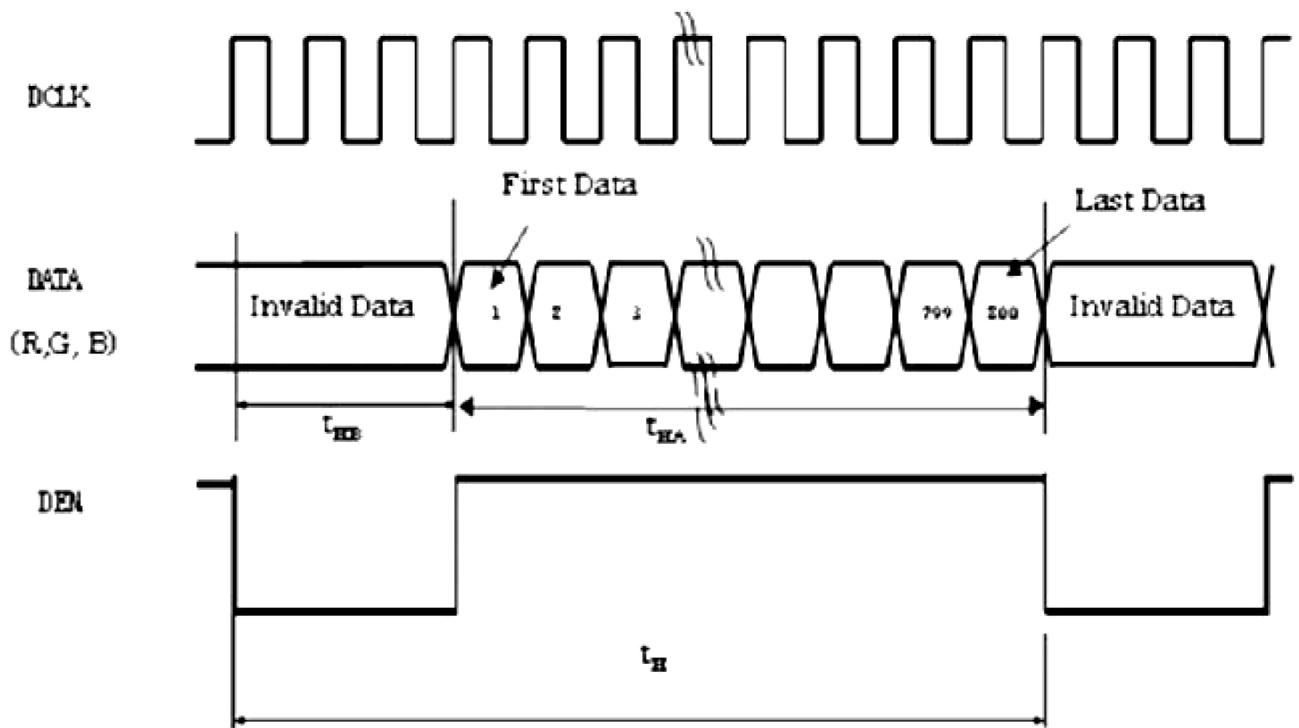


## 5.5 Timing Sequence(Timing Chart)

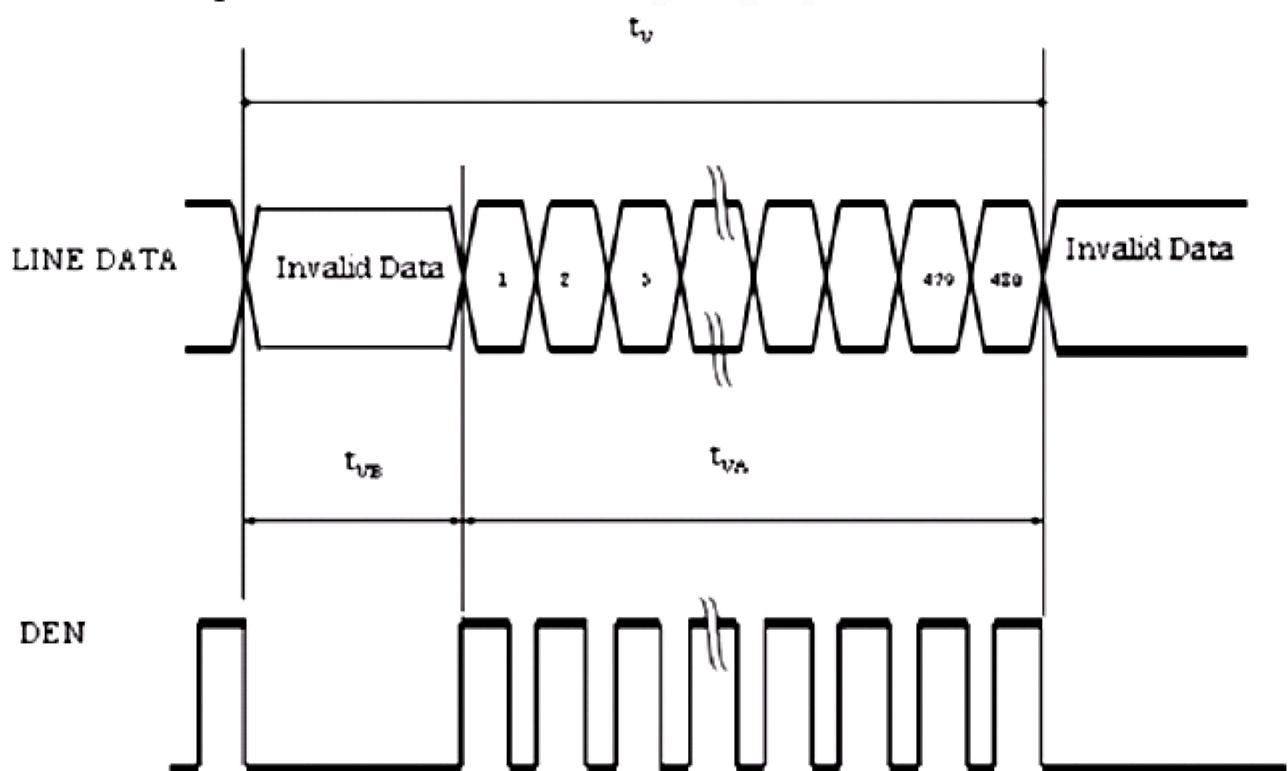
### 5.5.1 DE Mode

Horizontal timing:

# 香港鑫联鑫科技有限公司

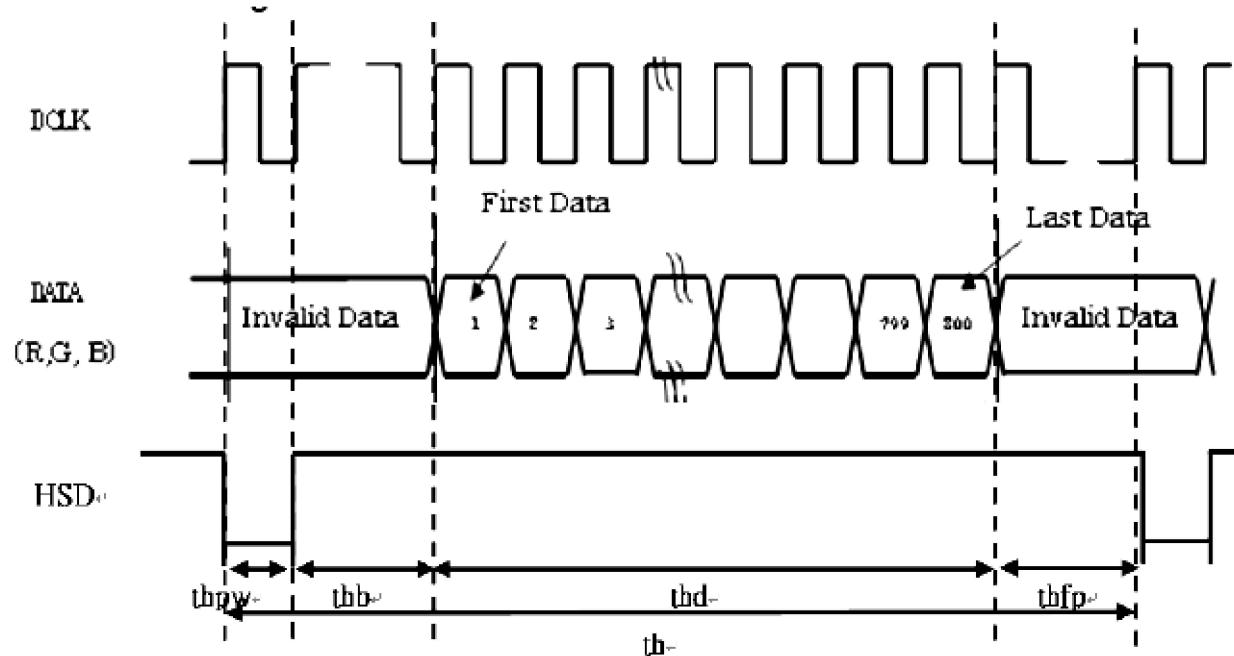


Vertical timing :

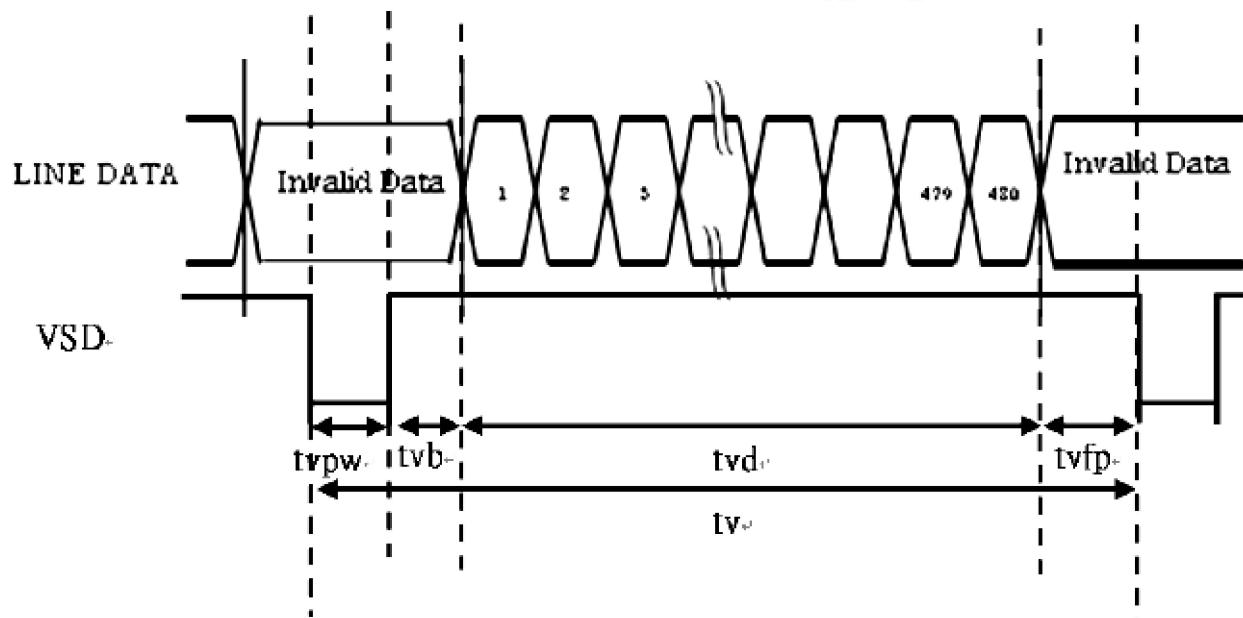


## 5.5.2 SYNC Mode Horizontal timing

# 香港鑫联鑫科技有限公司

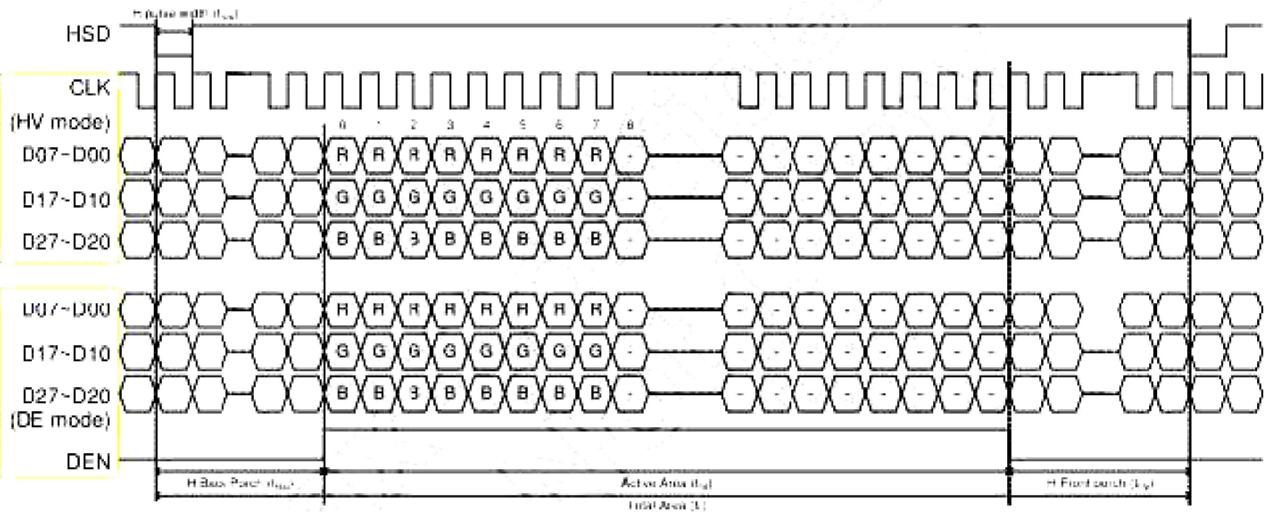


Vertical timing :

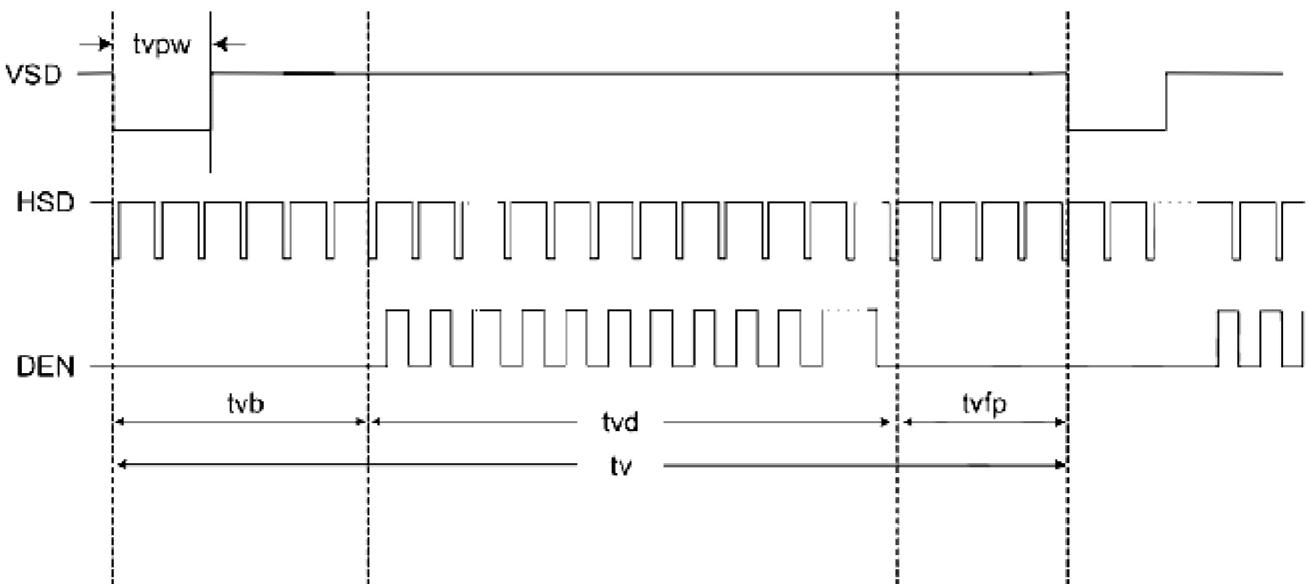


## 5.5.3 Data Input Format Horizontal timing:

# 香港鑫联鑫科技有限公司



Vertical timing :



# 香港鑫联鑫科技有限公司

## 6.0 Reliability test items

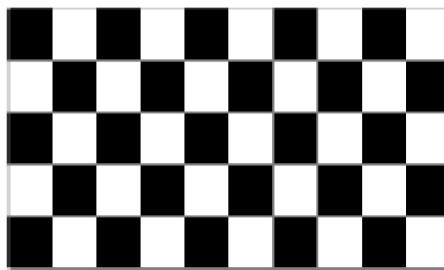
### 6.1 Temperature and Humidity

NO <sup>②</sup>	Item <sup>③</sup>	Conditions <sup>④</sup>	Remark <sup>⑤</sup>
1 <sup>②</sup>	High Temperature Storage <sup>③</sup>	Ta=+70°C, 240hrs <sup>④</sup>	<input type="checkbox"/> ⑤
2 <sup>②</sup>	Low Temperature Storage <sup>③</sup>	Ta=-20°C, 240hrs <sup>④</sup>	<input type="checkbox"/> ⑤
3 <sup>②</sup>	High Temperature Operation <sup>③</sup>	Ta=+60°C, 240hrs <sup>④</sup>	<input type="checkbox"/> ⑤
4 <sup>②</sup>	Low Temperature Operation <sup>③</sup>	Ta=-10°C, 240hrs <sup>④</sup>	<input type="checkbox"/> ⑤
5 <sup>②</sup>	High Temperature and High Humidity (operation) <sup>③</sup>	Ta=+60°C, 90%RH, 240hrs <sup>④</sup>	<input type="checkbox"/> ⑤
6 <sup>②</sup>	Thermal Cycling Test (non-operation) <sup>③</sup>	-20°C (0.5hr) → +70°C (0.5hr), 200cycles <sup>④</sup>	<input type="checkbox"/> ⑤

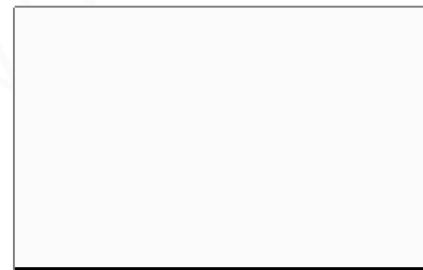
Note 1: Condition of Image Sticking test: 25 °C ± 2 °C

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

After 5 mins, the mura must be disappeared completely .



(a) Test Pattern (chess board Pattern )



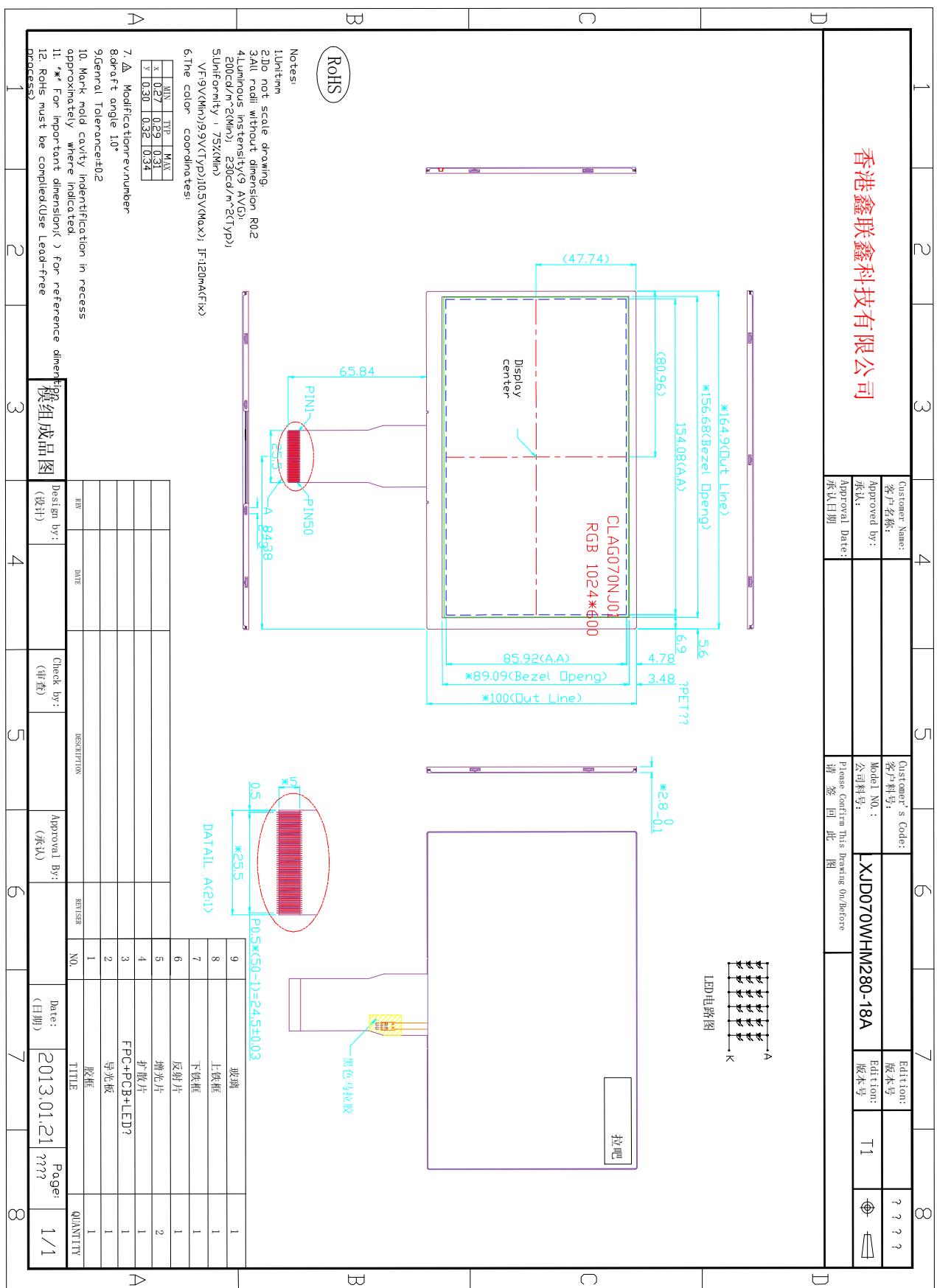
(b) Gray Pattern

### 6.2 Shock and Vibration

ITEMS	CONDITIONS
Shock (Non-Operation)	<ul style="list-style-type: none"><li>Shock level : 980m/s<sup>2</sup>(equal to 100G).</li><li>Waveform : 1/2 Sine wave,6msec</li><li>±X, ±Y, ±Z, each axis 1 times</li></ul>
Vibration (Non-Operation)	<ul style="list-style-type: none"><li>Frequency range : 8~33.3Hz</li><li>Stoke : 1.3 mm</li><li>Vibration : sinusoidal wave, perpendicular axis (both x, z axis:2Hrs, y axis 4Hrs).</li><li>Sweep : 2.9G, 33.3 Hz -400 Hz</li><li>Cycle : 15 min</li></ul>

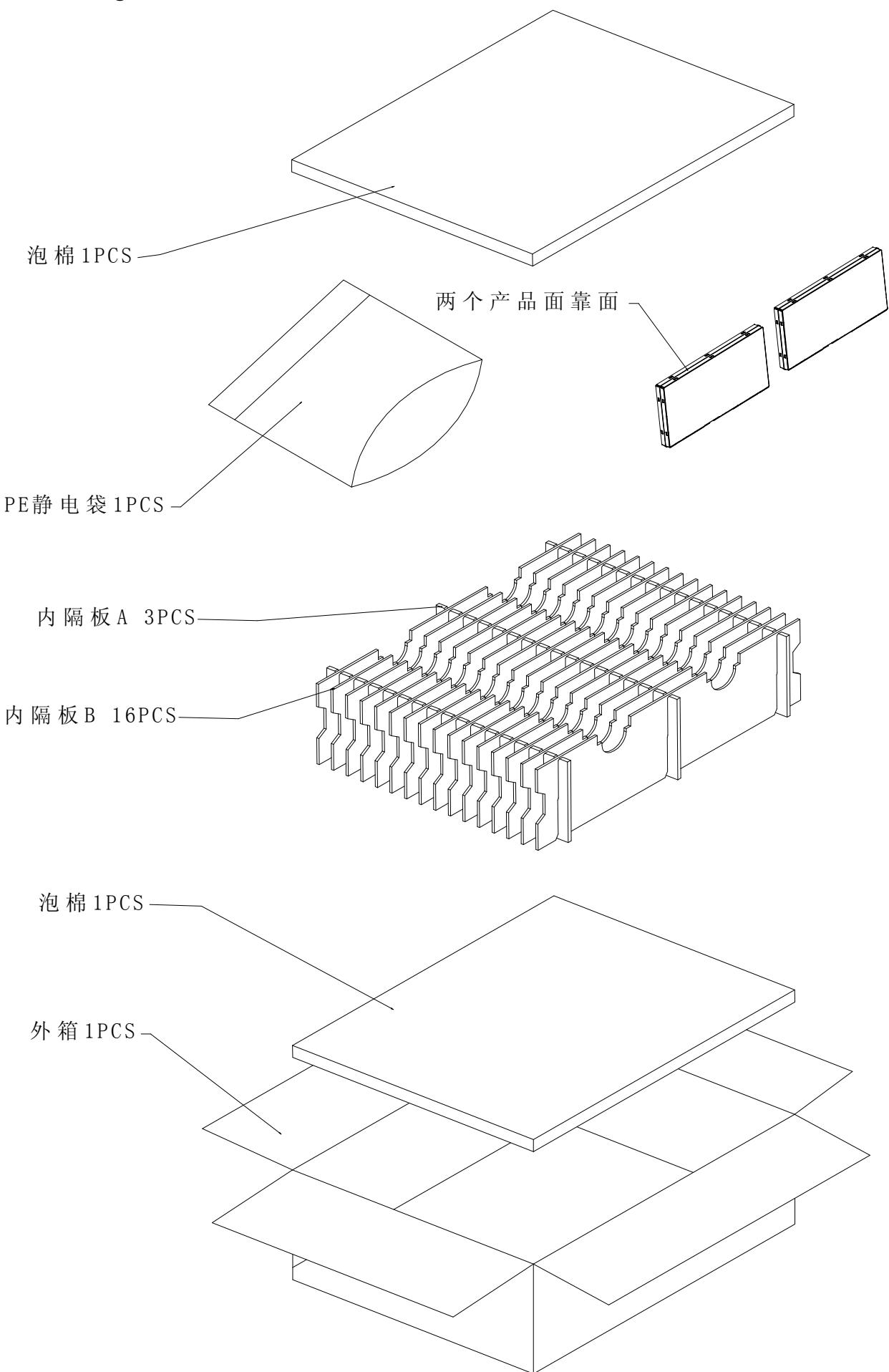
# 香港鑫联鑫科技有限公司

## 7.0 Outline dimension



# 香港鑫联鑫科技有限公司

## 8. Packing form



# 香港鑫联鑫科技有限公司