

# TOPLAND ELECTRONICS (H.K) CO.,LIMITED

## PRODUCT SPECIFICATIONS

For Customer: \_\_\_\_\_

: APPROVAL FOR SPECIFICATION

Customer Model No. \_\_\_\_\_

: APPROVAL FOR SAMPLE

Module No.: TIAN-G07004-03

Date : 2018-07-12

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### For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT
John	Techshu		Dmjjiang

**2. Revision Record**

Date	Rev.No.	Page	Revision Items	Prepared
<b>2018-07-12</b>	<b>V0</b>		<b>The first release</b>	<b>JC</b>

## 3. General Specifications

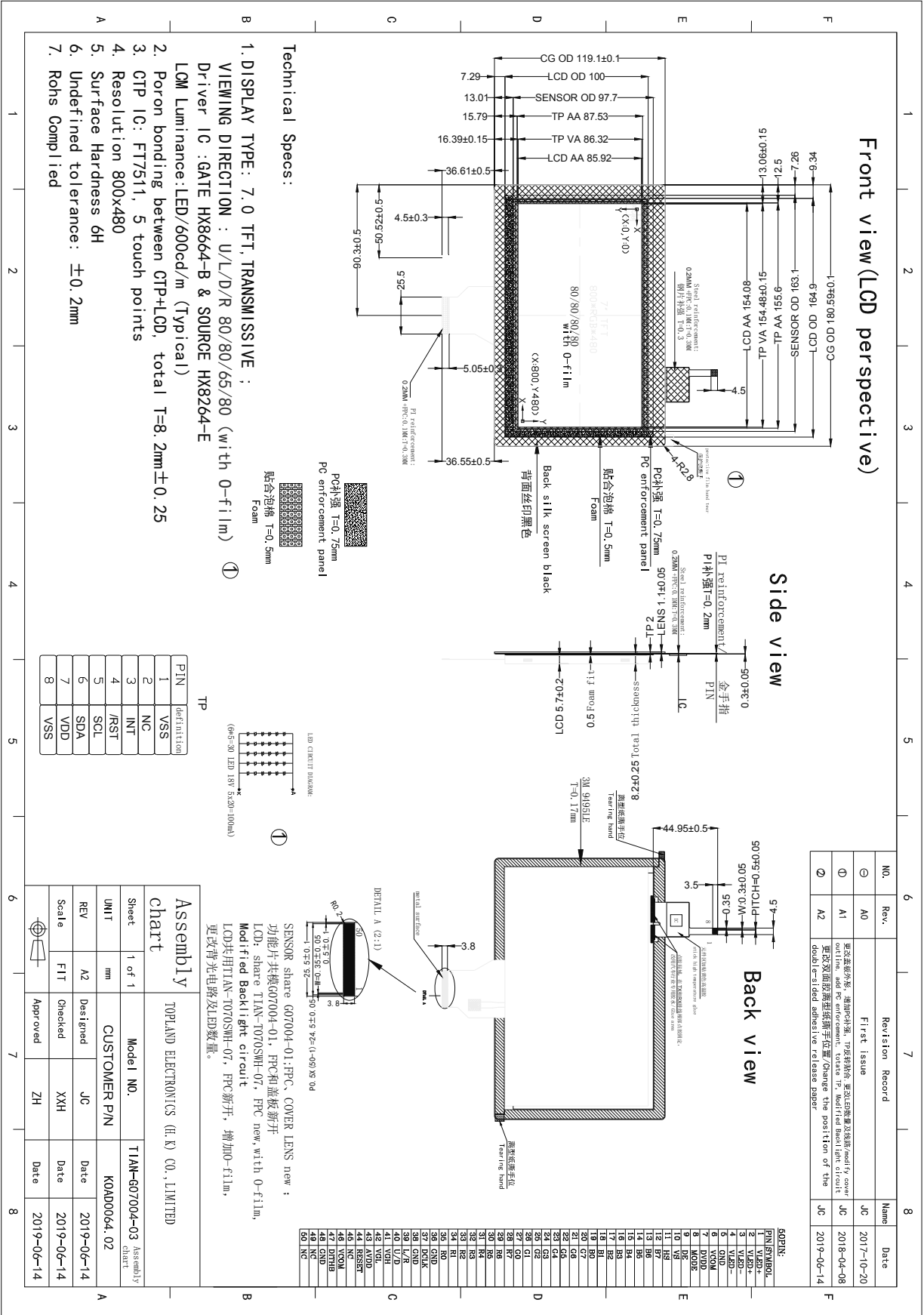
TIAN-G07004-03 is a TFT-LCD module. It is composed of a TFT-LCD panel,CTP, driver IC, FPC, a back light unit. The 7.0" display area contains 800 x 480pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Note 1: Color tune is slightly changed by temperature and driving voltage.

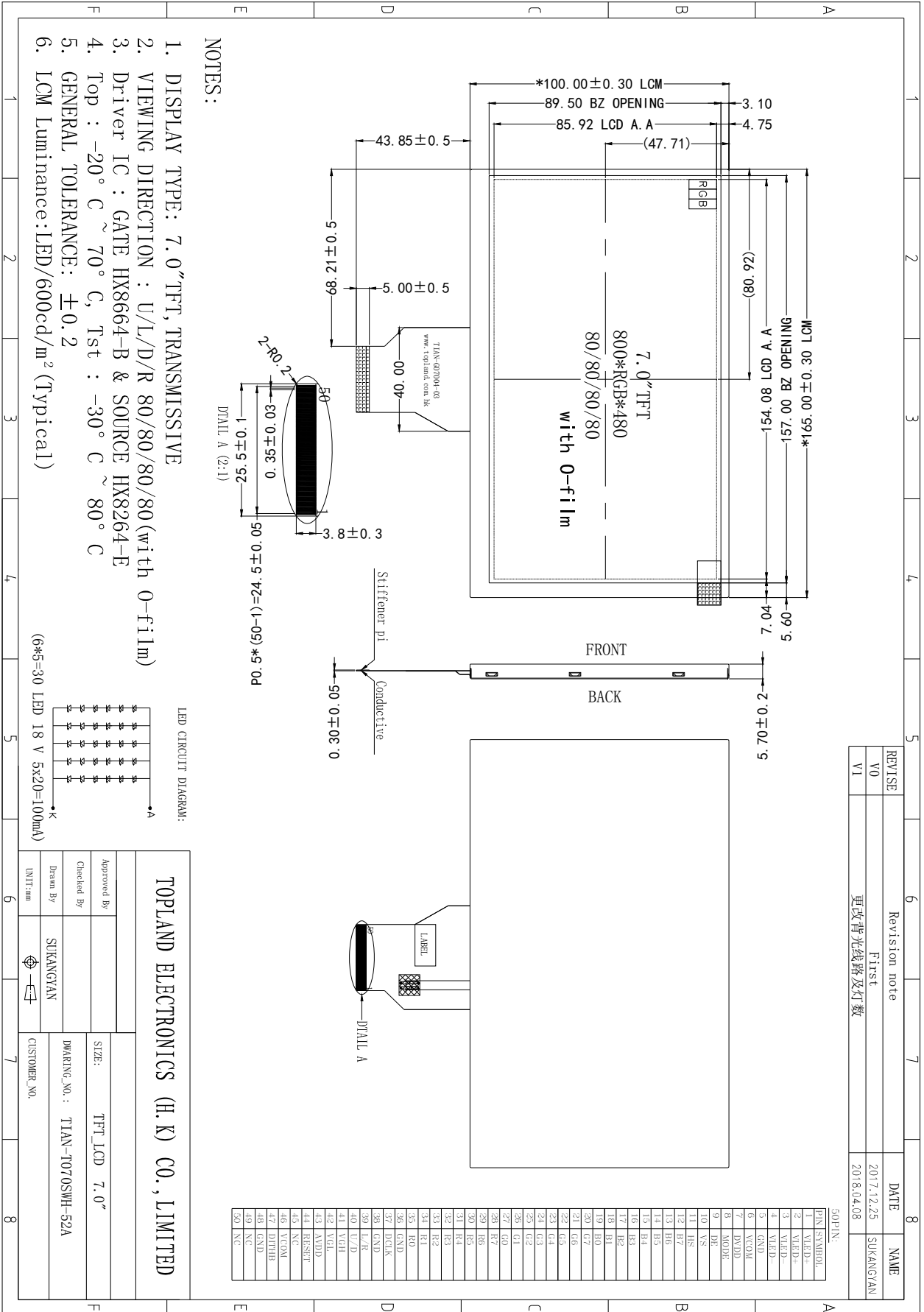
Note 2: Without FPC and Solder.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	°C	
Storage temperature	-30~+80	°C	
Module size	Refer to outline drawing	mm	
Active Area(W×H)	154.08X85.92	mm	
Number of Dots	800×480	dots	
LCM Controller	-	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	Refer to outline drawing	-	
Backlight	5X6-LEDs (white)	pcs	
Weight	---	g	
Interface	RGB888	-	
TP Outline Dimension	180.6*119.1	mm	
TP Controller	FT7511	--	
Surface hardness	6H		
Transparency	86%		

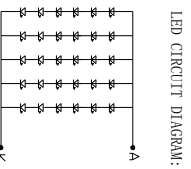
### 4.Outline.Drawing



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- NOTES:
1. DISPLAY TYPE: 7.0" TFT, TRANSMISSIVE
  2. VIEWING DIRECTION : U/L/D/R 80/80/80/80 (with 0-film)
  3. Driver IC : GATE HX8664-B & SOURCE HX8264-E
  4. Top : -20° C ~ 70° C, Tst : -30° C ~ 80° C
  5. GENERAL TOLERANCE: ±0.2
  6. LCM Luminance: LED/600cd/m<sup>2</sup> (Typical)



(6\*5=30 LED 18 V 5x20=100mA)

REVISE	Revision note	DATE	NAME
V0	First	2017.12.25	SUKANGYAN
V1	更改背光线路及灯数	2018.04.08	

**TOPLAND ELECTRONICS (H. K) CO., LIMITED**

Approved By	SIZE: TFT_LCD 7.0"
Checked By	
Drawn By	DWARING NO.: TIAN-70705WH-52A
SUKANGYAN	CUSTOMER NO.

**5.Absolute Maximum Ratings(Ta=25°C)**

**5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25°C)**

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	DV <sub>DD</sub>	-0.3	5.0	V	1, 2
	AV <sub>DD</sub>	6.5	13.5	V	
	V <sub>GH</sub>	-0.3	40.0	V	
	V <sub>GL</sub>	-20	0.3	V	
	V <sub>GH</sub> -V <sub>GL</sub>	-	40.0	V	

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V<sub>DVDD</sub> > V<sub>SS</sub> must be maintained.

**5.2 Typical operation conditions**

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DVDD	3.0	3.3	3.6	V	
	AVDD	10.2	10.4	10.6	V	
	VGH	15.3	16.0	16.7	V	
	VGL	-7.7	-7.0	-6.3	V	
Input signal voltage	VCOM	2.8	3.8	4.8	V	
Input logic high voltage	VIH	0.7 VDD	-	DVDD	V	
Input logic low voltage	VIL	0	-	0.3DVDD	V	

**5.3 Environmental Absolute Maximum Ratings.**

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30°C	80°C	-20°C	70°C	1,2
Humidity	-	-	-	-	3

1. *The response time will become lower when operated at low temperature.*

2. *Background color changes slightly depending on ambient temperature.*

*The phenomenon is reversible.*

3. *T<sub>a</sub> ≤ 40 °C: 85%RH MAX.*

*T<sub>a</sub> > 40 °C: Absolute humidity must be lower than the humidity of 85%RH at 40 °C.*

## 6. Electrical Specifications

### 6.1 Electrical characteristics(V<sub>ss</sub>=0V ,T<sub>a</sub>=25°C)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		DVDD	T <sub>a</sub> =25°C	3.0	3.3	3.6	V	
Input voltage	'H'	V <sub>IH</sub>	DVDD=3.3V	0.7 VDD	-	DVDD	V	
	'L'	V <sub>IL</sub>	DVDD=3.3V	0	-	0.3DVDD	V	
Current for Driver		I <sub>GH</sub>	V <sub>GH</sub> =16.0V	-	0.2	1.2	mA	2
		I <sub>GL</sub>	V <sub>GL</sub> =-7.0V	-	0.2	1.2	mA	2
		I <sub>DVDD</sub>	DVDD=3.3V		4.0	10.5	mA	2
		I <sub>AVDD</sub>	AVDD=10.4V		20	50	mA	2

Note:

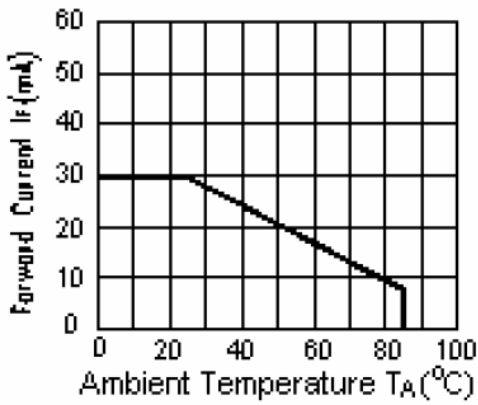
- 1:When an optimum contrast is obtained in transmissive mode.
- 2: Tested in 1×1 chessboard pattern.



**6.2 LED backlight specification(VSS=0V ,Ta=25°C)**

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	Vf	If=5X20mA		18		V	
Uniformity	$\Delta Bp$	If=5X20mA	75			%	

Note:



ILED VS TEMP

**6.3 Interface signals**

Pin No.	Symbol	I/O	Function
1-2	VLED+	P	LED back light(Anode)
3-4	VLED-	P	LED back light(Cathode)
5	GND	P	Ground.
6	VCOM	P	Common voltage
7	DVDD	P	Power supply
8	MODE	I	DE/YSNC mode select
9	DE	I	Data enable pin
10	VS	I	Frame sync signal
11	HS	I	Line sync signal
12-19	B7~B0	I	Blue data bus
20-27	G7~G0	I	Green data bus
28-35	R7~R0	I	Red data bus
36	GND		Ground.
37	DCLK	I	Data clock
38	GND	P	Ground.
39	L/R	I	Right/Left sequence control of source driver
40	U/D	I	Gate driver Up/Down scan control of gate driver
41	VGH	I	Gate on voltage
42	VGL	P	Gate off voltage
43	AVDD	P	power for analog circuit
44	RESET	I	Chip reset pin
45	NC	-	No connection.
46	VCOM	P	Common voltage
47	DITHB	I	Dithering function
48	GND	P	Ground
49-50	NC	-	No connection.

**6.4 AC Characteristics**

**6.4.1 AC electrical characteristics**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	$T_{hst}$	8	-	-	ns
HS hold time	$T_{hhd}$	8	-	-	ns
VS setup time	$T_{vst}$	8	-	-	ns
VS hold time	$T_{vhd}$	8	-	-	ns
Data setup time	$T_{dsu}$	8	-	-	ns
Data hold time	$T_{dhd}$	8	-	-	ns
DE setup time	$T_{esu}$	8	-	-	ns
DE hold time	$T_{ehd}$	8	-	-	ns
VDD Power On Slew rate	$T_{POR}$	-	-	20	ms
RSTB pulse width	$T_{Rst}$	10	-	-	us
CLKIN cycle time	$T_{cph}$	20	-	-	ns
CLKIN pulse duty	$T_{cwh}$	40	50	60	%
Output stable time	$T_{sst}$	-	-	6	us

● **Horizontal timing**

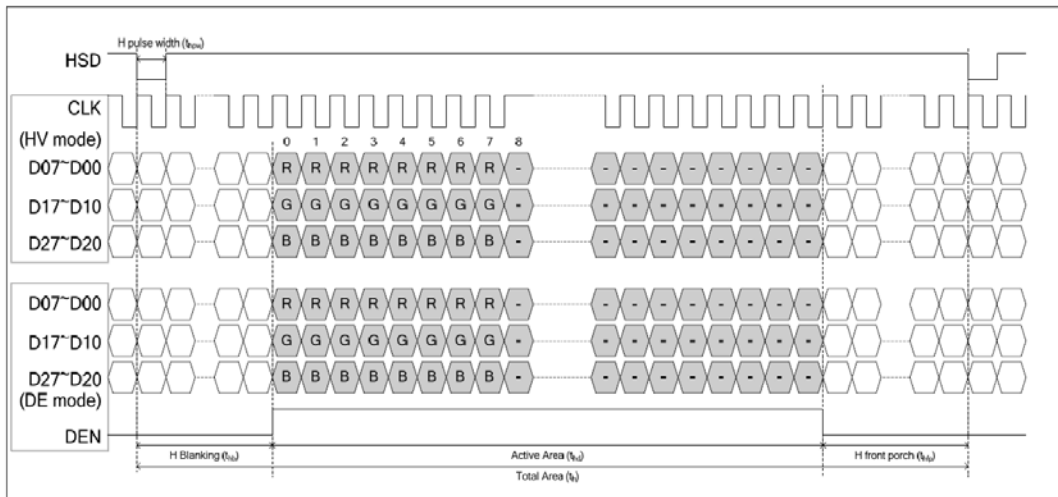


Figure 9. 1 Horizontal Input Timing Diagram

● **Vertical timing**

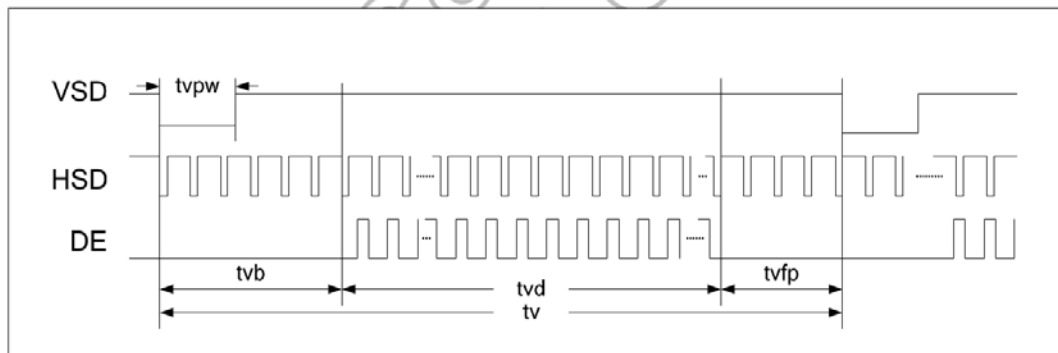


Figure 9. 2 Vertical Input Timing Diagram

**6.4.2 data input format**

● **Horizontal timing**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	800			DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
HS pulse width	thpw	1	48	255	DCLK
HS Back Porch (Blanking)	thb	88			DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE mode Blanking	th-thd	85	128	512	DCLK

● **Vertical timing**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	480			T <sub>H</sub>
VS period time	tv	513	525	767	T <sub>H</sub>
VS pulse width	tvpw	3	3	255	T <sub>H</sub>
VS Back Porch (Blanking)	tvb	32			T <sub>H</sub>
VS Front Porch	tvfp	1	13	255	T <sub>H</sub>
DE mode Blanking	tv-tvd	4	45	255	T <sub>H</sub>

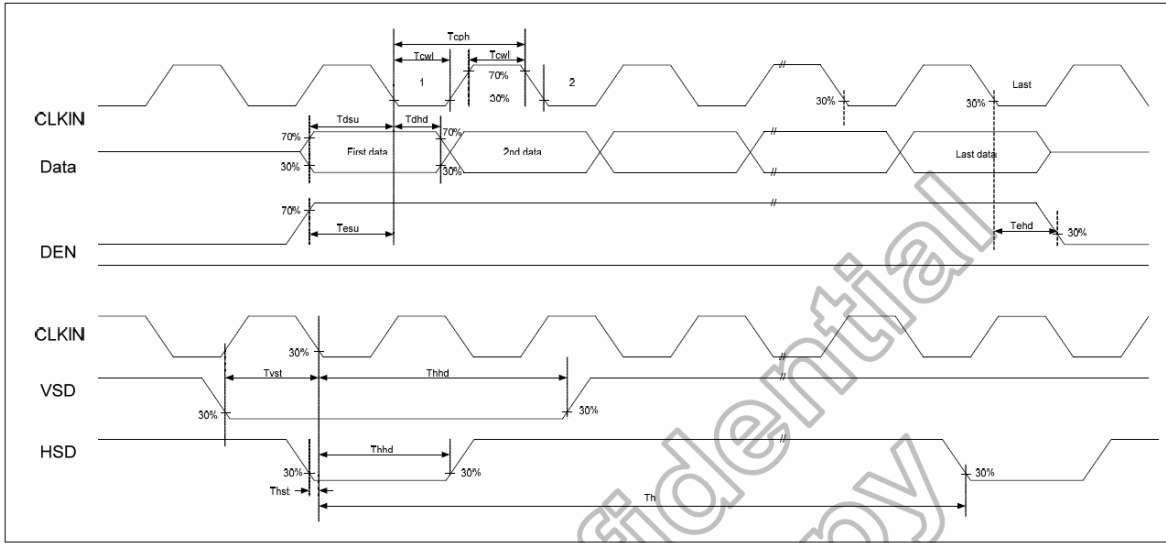
**6.5 Waveform**

6.5.1 parallel RGB mode

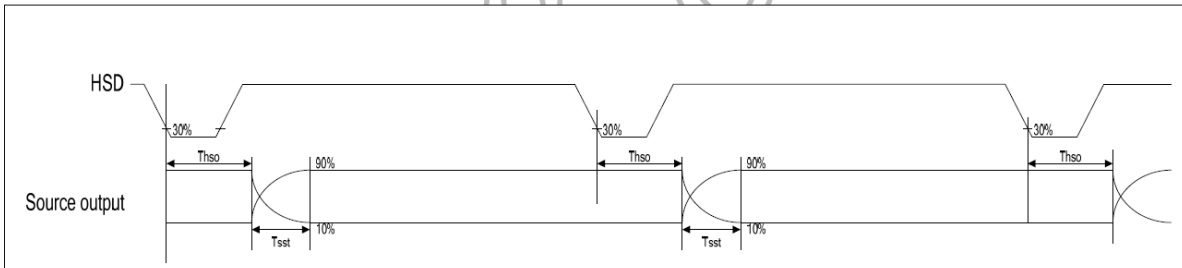
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	64			CLKIN	-
Time from HSD to LD	Thld	64			CLKIN	-
Time from HSD to STV	Thstv	2			CLKIN	-
Time from HSD to CKV	Thckv	20			CLKIN	-
Time from HSD to OEV	Thoev	4			CLKIN	-
LD Pulse Width	Twld	10			CLKIN	-
CKV Pulse Width	Twckv	66			CLKIN	-
OEV Pulse Width	Twoev	74			CLKIN	-

## 6.5.2 Timing waveform table

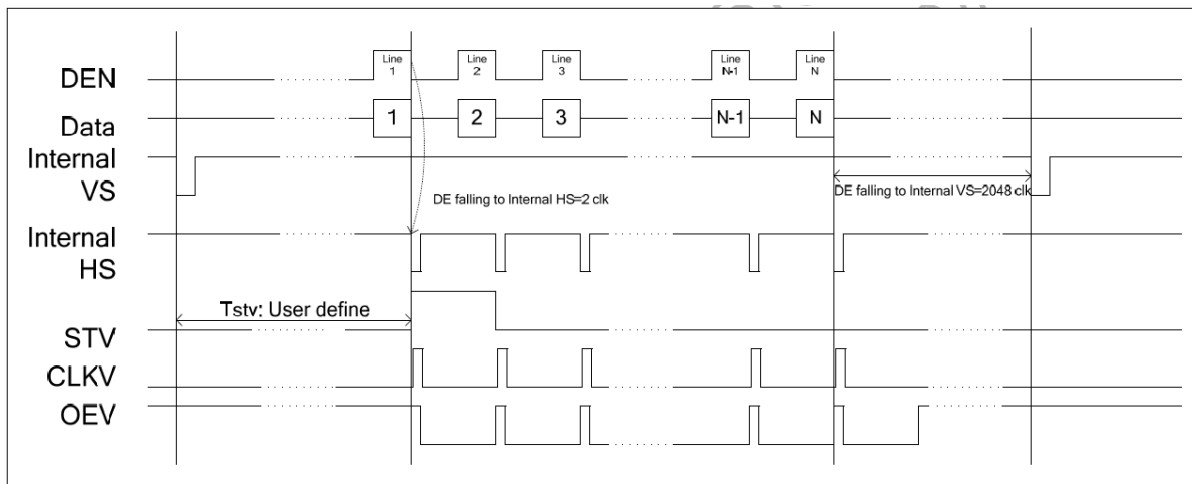
### 6.5.2.1 input clock and data timing waveform



### 6.5.2.2 Source output timing waveform(Cascade)



## 6.5.3 Vertical timing diagram DE(Cascade)



**7. Optical Characteristics**

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	$\theta=0^\circ$	-	600	-	Cd/m <sup>2</sup>	1
Uniformity	$\Delta$ Bp	$\Phi=0^\circ$	75	-	-	%	1,2
Viewing Angle	3:00	Cr $\geq$ 10	-	80	-	Deg	3
	6:00		-	80	-		
	9:00		-	80	-		
	12:00		-	80	-		
Contrast Ratio	Cr	$\theta=0^\circ$	300	500	-	-	4
Response Time	T <sub>r</sub>	$\Phi=0^\circ$	-	10	-	ms	5
	T <sub>f</sub>		-	10	-	ms	
Color of CIE Coordinate	W	x	$\theta=0^\circ$ $\Phi=0^\circ$	0.28	-	-	1,6
		y		0.33	-	-	
	R	x		0.51	-	-	
		y		0.34	-	-	
	G	x		0.31	-	-	
		y		0.56	-	-	
	B	x		0.15	-	-	
		y		0.14	-	-	
NTSC Ratio	S	50	60	-	%		

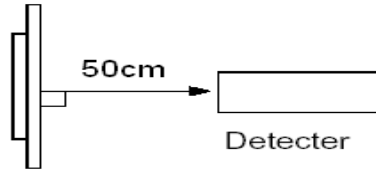
*Note: The parameter is slightly changed by temperature, driving voltage and materiel*

*Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment PR-705 (Φ8mm)*

*Measuring condition:*

- *Measuring surroundings: Dark room.*
- *Measuring temperature: Ta=25 °C.*
- *Adjust operating voltage to get optimum contrast at the center of the display.*

*Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.*

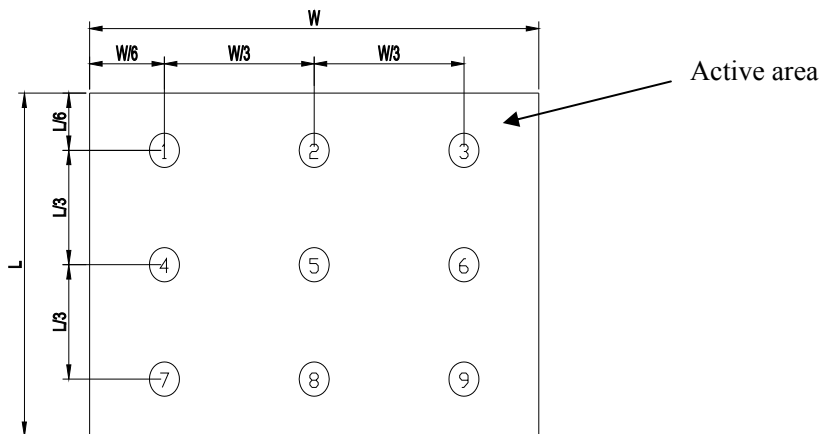


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

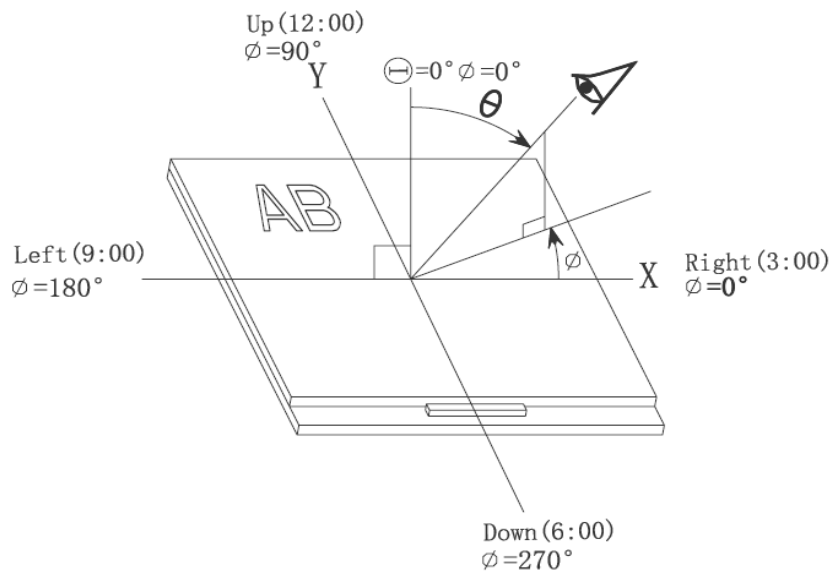
$Bp (\text{Max.})$  = Maximum brightness in 9 measured spots

$Bp (\text{Min.})$  = Minimum brightness in 9 measured spots.

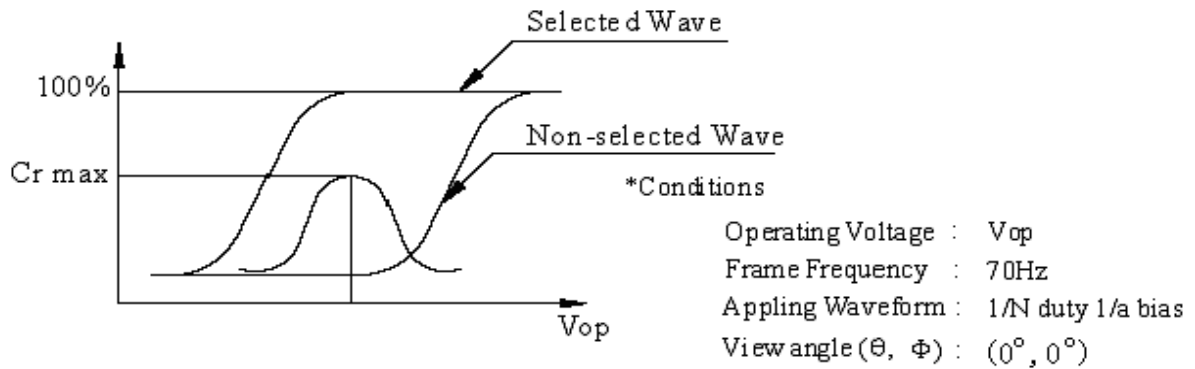


Note 3: The definition of viewing angle:

Refer to the graph below marked by  $\vartheta$  and  $\phi$



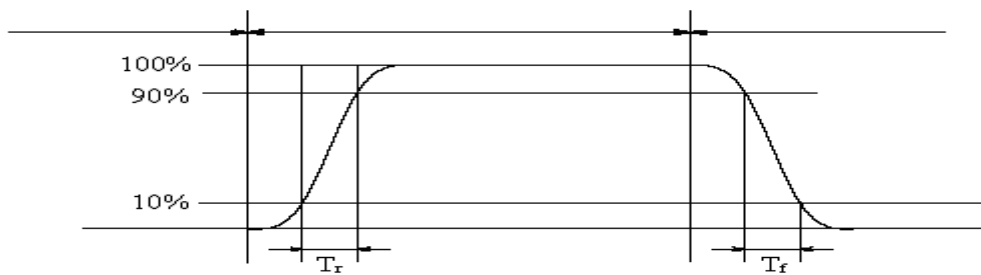
Note 4: Definition of contrast ratio.( Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

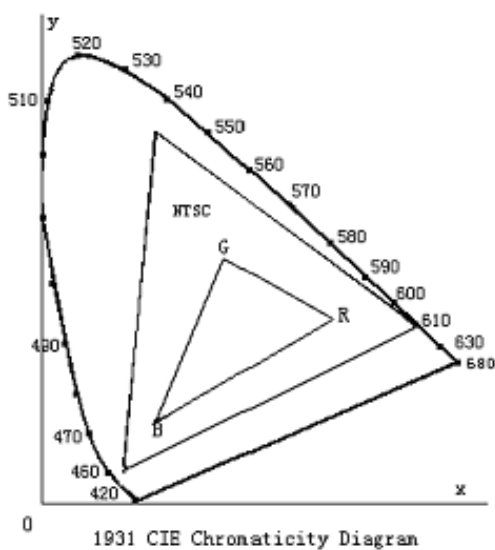
**Note 5: Definition of Response time. (Test LCD using DMS501):**

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



*The definition of response time*

**Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.**



**Color gamut:**

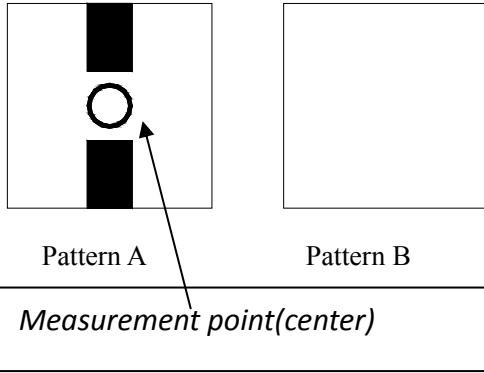
$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

**Note 7: Definition of cross talk.**

$$\text{Cross talk ratio}(\%) = \frac{|\text{pattern A Brightness} - \text{pattern B Brightness}|}{\text{pattern A Brightness}} \times 100$$



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Electric volume value= $3F \pm 3Hex$

## 8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80°C±2°C 96H Restore 2H at 25°C Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	70°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	-20°C±2°C 96H Restore 4H at 25°C Power on	
5	High Temperature/Humidity Storage	60°C±2°C 90%RH 96H Power off	
6	Temperature Cycle	<del>-30°C</del> ———— <del>80°C</del> after 5 cycle, Restore 2H at 25°C 30min 5min 30min Power off	
7	Vibration Test	10Hz~150Hz, 100m/s <sup>2</sup> , 120min	Not allowed cosmetic and electrical defects.
8	Shock Test	Half- sine wave,300m/s <sup>2</sup> ,11ms	

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

## **9. Precautions for Use of LCD Modules**

### **9.1 Handling Precautions**

9.1.1 *The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.*

9.1.2 *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.*

9.1.3 *Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.*

9.1.4 *The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.*

9.1.5 *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

9.1.6 *Do not attempt to disassemble the LCD Module.*

9.1.7 *If the logic circuit power is off, do not apply the input signals.*

9.1.8 *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

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 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 :  $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$

Relatively humidity:  $\leq 80\%$

9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

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

## 10. Appearance Inspection 外观检验

外观检查条件及方法: Conditions and methods of appearance inspection

10.1、检验距离 Inspection distance: 25~30cm

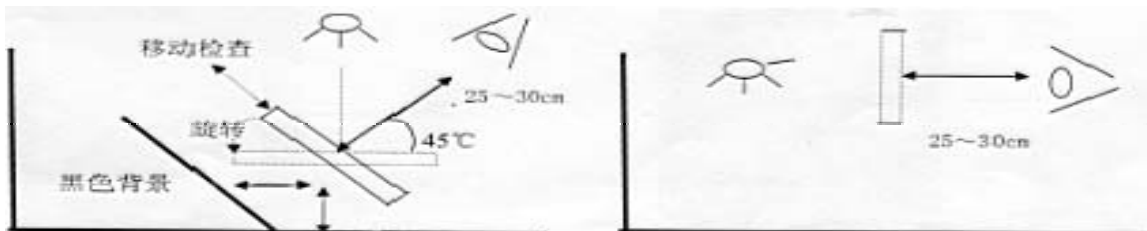
10.2、灯源至产品 From lamp source to product:  $250 \pm 100\text{cm}$

10.3、检验角度: 在黑色背景下, 1K-1.5K Lux 勒克斯 (照明单位), 正视角或斜视 45 度反光检查白点、刺伤点、脏污、毛屑、金属残留、ITO 针孔、刮伤等不良; 产品对光检查可视区的黑色点、油墨针孔、油墨刮伤等不良。

Angel of inspection: Under a black background, 1k-1.5k lux (illumination unit), reflecting inspection from front view angel and oblique view angel of  $45^{\circ}$ , badness like white dot, stab wound point, smudginess, soft flock, metal remain, ITO pinhole, ink scratch etc. And beam-focusing inspection products in view area, badness like black dot, printing ink pinhole, printing ink scratch etc.

a、正视角或斜视 45 度反光检  
reflecting inspection from front view angel  
or oblique view angel of  $45^{\circ}$

b、产品对光检查  
product beam-focusing  
inspection

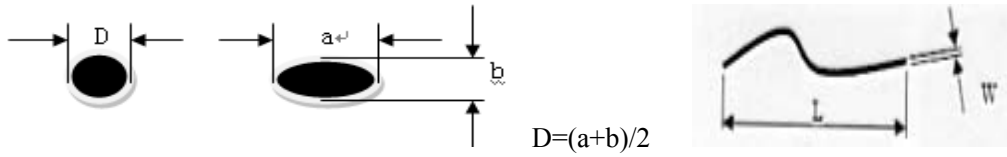


10.4、点状缺陷以点的直径 D 计算, 不规则点以:  $D=(\text{长}+\text{宽})/2$  计算, 目视采用 FILM 卡比对片比对, 实际大小采用显微镜测量; 条状缺陷以两端垂直长度 L 或最宽位置的宽度 W 计算。目视采用 FILM 卡比对片比对, 实际大小采用显微镜测量。

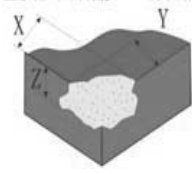
Punctate defects count by D dot diameter, irregular dot count by  $D=(\text{length}+\text{width})/2$ , visual take FILM card comparison lice, and microscope be used to measure actual size; strip defects count by L length of perpendicular between two terminal

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or W width of widest situation. Visual take FILM card comparison lice, and microscope be used to measure actual size.





## 10.5、产品外观标准 products appearance standard:

不良项目 Bad item	触摸屏标准 TP standard	缺陷分类 Defects classification		判定 judge
		M A	MI	
<b>崩角</b> corner breakage  	$X \leq 1.0\text{mm}; Y \leq 1.0\text{mm}; Z \leq 1/2T$ ; 单边允许1 个 $X \leq 1.0\text{mm}; Y \leq 1.0\text{mm}; Z \leq 1/2T$ ; unilateral allowed 1		★	OK
	$X > 1.0\text{mm}, Y > 1.0\text{mm}$		★	NG
<b>崩边</b> edge breakage  	$X \leq 1.0\text{mm}; Y \leq 1.0\text{mm}, Z \leq 1/2T$ ; 单边允许1 个 $X \leq 1.0\text{mm}; Y \leq 1.0\text{mm}, Z \leq 1/2T$ ; unilateral allowed 1		★	OK
	$X > 1.0\text{mm}, Y > 1.0\text{mm}$		★	NG
	- Sensor 面崩边/崩角未伤及线路且正视不可见。 Sensor surface edge/corner breakage not damage circuit and not visible from front view  - Lens 面崩边、崩角以装机不影响到外观为准。 Lens surface edge/corner breakage is subject to not affect appearance		★	OK
	Sensor 面崩边或崩角伤及线路或正视可见。 Sensor surface edge/corner breakage damage circuit and visible from front view		★	NG

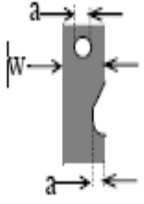



# TOPLAND ELECTRONICS (H.K) CO.,LIMITED

<p>玻璃裂纹 Glass crack</p> 	<p>任何裂纹 Any crack</p>		★		NG	
<p>线状物（包括刮伤、纤维） Threads (including scratch, fiber)</p>  <p>W:宽度width L:长度length</p>			<p><math>W \leq 0.05\text{mm}</math>, 忽略不计 <math>W \leq 0.05\text{mm}</math>, ignore</p>		★	OK
	<p><math>0.05\text{ mm} \leq W \leq 0.1\text{ mm}</math>, <math>L \leq 3\text{mm}</math>, 允许2条, 距离在10mm以上。 <math>0.05\text{ mm} \leq W \leq 0.1\text{ mm}</math>, <math>L \leq 3\text{mm}</math>, allowed two lines, distance should above 10mm</p>				★	OK
			<p><math>W &gt; 0.1\text{mm}</math>, <math>L &gt; 3\text{mm}</math></p>	★		NG
<p>点状物（异色点, 包括白点、黑点、气泡） D 代表直径 Punctual substances (heterochrome dot, including white dot, black dot, air bubble, D stands for diameter)</p>  <p><math>D = (x + y) / 2</math></p>			<p><math>D \leq 0.15\text{ mm}</math>, 忽略不计, 整面及密集点不允许。 <math>D \leq 0.15\text{ mm}</math>, ignore, high density of such dots is not allowed</p>		★	OK
	<p><math>0.15\text{mm} &lt; D \leq 0.20\text{ mm}</math>, 允许 2 个, 距离在 10mm 以上。 <math>0.15\text{ mm} &lt; D \leq 0.20\text{ mm}</math>, allowed two dots, between which distance should be above 10mm</p>				★	OK
	<p><math>0.20\text{mm} &lt; D \leq 0.3\text{mm}</math>, 允许 1 个, 距离在 10mm 以上。 <math>0.20\text{ mm} &lt; D \leq 0.3\text{ mm}</math>, allowed one dot, distance between dots should be above 10mm</p>				★	OK
			<p><math>D &gt; 0.3\text{mm}</math></p>	★		NG
			<p><math>D \leq 0.15\text{ mm}</math>, 忽略不计, 整面及密集点不允许。 <math>D \leq 0.15\text{ mm}</math>, ignore, the whole surface and dense dots not allowed.</p>		★	OK

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点状 (同色点) <b>Punctiform (the same color dot)</b>  	0.15 mm < D ≤ 0.20mm, 允许 2 个, 距离在 10mm 以上。 0.15 mm < D ≤ 0.20mm, allowed two dots, distance between dots should be above 10mm.	★	OK
	0.20 mm < D ≤ 0.3mm, 允许 1 个, 距离在 10mm 以上。 0.20 mm < D ≤ 0.3mm, allow one dot, distance should be above 10mm.	★	OK
	D > 0.3mm	★	NG
油墨漏光 <b>Printing ink leak light</b>  	边沿区域漏光宽度 ≤ 0.3mm Light leak area of cover edge ≤ 0.3mm	★	OK
	边沿区域漏光宽度 > 0.3mm Light leak area of cover edge > 0.3mm	★	NG
	可以清洁的脏污, 在 > 万级区域检查单批数量 ≤ 20%; 在 ≤ 万级区域检查单批数量 ≤ 10% 备注: 该不良比例不与普通不良抽检的 AQL 混和统计 Smudginess can be cleaned, inspect ≤ 20% quantity of single lot in > 10000 non-dust area; inspect ≤ 10% quantity of single lot in ≤ 10000 non-dust area	★	OK
表面脏污 <b>Surface smudginess</b>	无法清洁的脏污按点状不良判定 Smudginess can not be cleaned be identified as punctiform defects	★	OK
	凹痕, 针孔 a ≤ w/3 Sink mark, pinhole a ≤ w/3	★	OK
<b>FPC 缺陷</b> <b>FPC defects</b>	开路/划伤线路/裂开 Open circuit/scratch circuit/cracking	★	NG
	氧化, 污染 Oxidation, contamination	★	NG
	FPC 折伤/压伤 FPC folded /extruded	★	NG

# TOPLAND ELECTRONICS (H.K) CO.,LIMITED

				
<p><b>FPC 折伤, 翘曲, 折痕, 黑白点</b>  <b>FPC warped, bend, Crease, black and white point</b></p> 	<p>FPC 翘曲, 折痕, 黑白点, 不影响功能、不伤及线路可接受          FPC bend, Crease, black and white point, no defect nor cuicirt damage is acceptable</p>		★	OK
<p>本压偏位 Pressing offset</p>	<p>FPC PIN 脚和 SENSOR 银浆 pin 脚偏移量 ≤ 1/3 允收          FPC PIN and SENSOR silver paste pin offset ≤ 1/3 acceptance</p>		★	OK
<p>气泡 bubble</p> 	<p>可视区不允许; Following issues are not allowed in Viewing Area</p>	★		NG
<p>丝印字符 silk printed text,</p> 	<p>非可视区正面不可见; Area beyond Viewing Area is not allowed to be seen from front view</p>		★	OK
	<p>LOGO 字体需清晰, 点缺陷 <math>\phi \leq 0.15\text{mm}</math>, <math>N \leq 1</math>;          LOGOs and printed texts should be clear for viewing, dot defect should follow <math>\phi \leq 0.15\text{mm}</math>, <math>N \leq 1</math></p>		★	OK
	<p>按键丝印点状缺陷 <math>\phi \leq 0.15\text{mm}</math>, <math>N \leq 1</math>;          Dot defect for press button silk print should follow <math>\phi \leq 0.15\text{mm}</math>, <math>N \leq 1</math></p>		★	OK
	<p>按键丝印有线状缺陷;          Line defect is not allowed</p>	★		NG
<p>锯齿 Serrated silk print</p>	<p>TP 屏边缘有锯齿状, 锯齿应 <math>\leq 0.2\text{mm}</math>          Serrated silk print on cover edge should be <math>\leq 0.2\text{mm}</math></p>		★	OK
<p>色差 color difference</p>	<p>以颜色确认样品为基准, 用色差仪测试差异值 <math>\Delta \leq 2.0</math>          use sample color as standard color, new products' color difference should be <math>\Delta \leq 2.0</math></p>		★	OK