

**MODEL NO : TM101JDHP01****MODEL VERSION: 00****SPEC VERSION : 2.6****ISSUED DATE: 2019-06-25**

- ☐ Preliminary Specification  
☒ Final Product Specification

**Customer : \_\_\_\_\_**

Approved by	Notes

**TIANMA Confirmed :**

Prepared by	Checked by	Approved by
Junwen Du	Longping Deng	KEVIN

This technical specification is subjected to change without notice

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## Record of Revision

Rev	Issued Date	Description	Editor
1.0	2015-04-13	Preliminary Specification Release	Yuelong.Zhou
1.1	2015-04-14	Modify the LED lifetime	Yuelong.Zhou
1.2	2015-04-15	Modify the LCM model number	Yuelong.Zhou
1.3	2015-04-30	Modify the Vcom	Yuelong.zhou
1.4	2015-05-13	Modify the LED lifetime	Yuelong.Zhou
1.5	2015-09-28	Update the Mechanical Drawing and Optical Characteristics	Junwen Du
2.0	2016-01-29	Final Specification Release	Junwen Du
2.1	2016-02-01	Update the reliability test	Junwen Du
2.2	2016-04-27	Update the power supply current	Junwen Du
2.3	2017-08-18	Change the Requirements on Environmental Protection in page 4.Ver 2.2 and Ver 2.3 have same display performance ( About Electric & Optical & Mechanical parts )	Junwen Du
2.4	2018-10-25	Update the pin description	Junwen Du
2.5	2019-03-04	Update the Voltage Min and Max value in page 8 and NTSC Min value in page 14	Junwen Du
2.6	2019-06-25	Change packing Drawing	Longping.Deng

## 1 General Specifications

Feature		Spec
<b>Display Spec.</b>	Size	10.1 inch
	Resolution	1280(RGB) × 800
	Technology Type	a-si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.1695x0.1695
	Display Mode	TM, Normally Black
	Surface Treatment	HC
<b>Mechanical Characteristics</b>	LCM (W x H x D) (mm)	229.46 x 149.10 x 2.50
	Active Area(mm)	216.96 x 135.60
	With /Without TSP	Without TSP
	Matching Connection Type	F62240-H1210A
	LED Numbers	33 LED
	Weight (g)	180g
<b>Electrical Characteristics</b>	Interface	LVDS 8-bit
	Color Depth	16.7M
	Driver IC	ST5821CA*3 + ST5084CA*1

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002 & UL & MSDS.

Note 3: LCM weight tolerance: ± 5%

## 2 Input/Output Terminals

Recommended connector: F62240-H1210A

Pin	Symbol	I/O	Description	Remark
1	Vcom	P	Common Voltage	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC		No Connect	
5	NC		No Connect	
6	NC		No Connect	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS differential data input	R0~R5,G0
9	Rxin0+	I	+LVDS differential data input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS differential data input	G1~G5,B0,B1
12	Rxin1+	I	+LVDS differential data input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS differential data input	B2~B5,HS,VS, DE
15	Rxin2+	I	+LVDS differential data input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS differential clock input	LVDS clock
18	RxCLK+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS differential data input	R6,R7,G6,G7, B6,B7
21	Rxin3+	I	+LVDS differential data input	
22	GND	P	Ground	
23	NC		No Connect	
24	NC		No Connect	
25	GND	P	Ground	
26	NC		No Connect	
27	NC		No Connect	
28	NC		No Connect	

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29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-		LED Cathode	
32	LED-		LED Cathode	
33	NC		No Connect	
34	NC		No Connect	
35	VGL	P	Gate OFF Voltage	
36	NC		No Connect	
37	NC		No Connect	
38	VGH		Gate ON Voltage	
39	LED+		LED Anode	
40	LED+		LED Anode	

Note1: P: Power/GND; I: input pin; O: output

### 3 Absolute Maximum Ratings

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	-0.3	3.9	V	Note1
Power For Analog Circuit	AVDD	-0.3	14	V	
Gate On Voltage	VGH	-0.3	42	V	
Gate Off Voltage	VGL	-19	0.3	V	
Operating Temperature	Top	-10	50	°C	
Storage Temperature	Tst	-20	60	°C	
Relative Humidity Note2	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 <sup>3</sup>	Ta>70°C

**Table 3 Absolute Maximum Ratings**

Note1: Input voltage include Rxin0-/ Rxin0+, Rxin1-/ Rxin1+, Rxin2-/ Rxin2+, Rxin3-/ Rxin3+, RxCLK-/ RxCLK+.

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 Driving TFT LCD Panel

GND=0V, Ta=25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
POWER Supply Voltage		VDD	3.00	3.30	3.60	V	
Power For Analog Circuit		AVDD	10.8	11	11.2	V	
Gate On Voltage		VGH	22	23	24	V	
Gate Off Voltage		VGL	-7.5	-7.0	-6.5	V	
Common Voltage		Vcom	4.2	4.3	4.4		
Input Signal Voltage	Low Level	V <sub>IL</sub>	GND	-	0.2xVDD	V	
	High Level	V <sub>IH</sub>	0.8xVDD	-	VDD	V	
Output Signal Voltage	Low Level	V <sub>IL</sub>	GND	-	0.2xVDD	V	
	High Level	V <sub>IH</sub>	0.8xVDD	-	VDD	V	

### 4.2 Driving Backlight

Ta=25℃

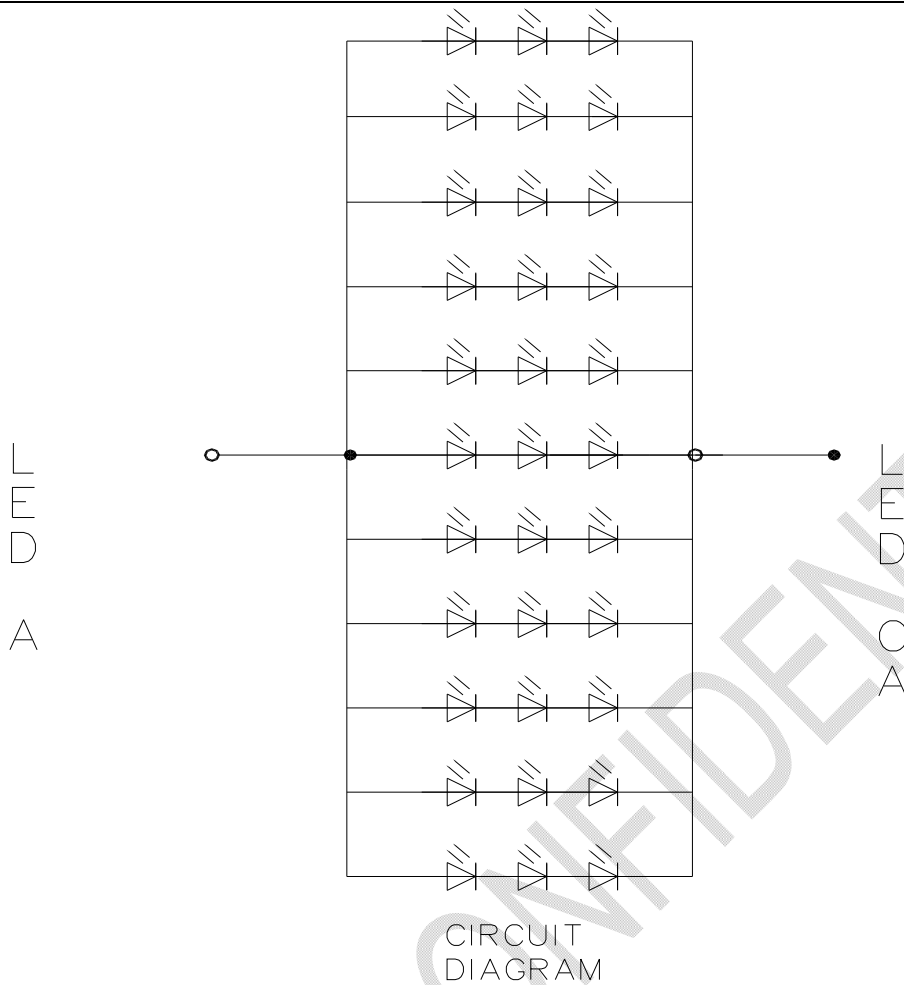
Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I <sub>F</sub>	--	220	330	mA	
Forward Current Voltage	V <sub>F</sub>	9.0	9.6	10.8	V	
LED lifetime	--	20000	30000	--	Hr	

Note1: The LED driving condition is defined for each LED module.

Note2: Under LCM operating, the stable forward current should be input. And forward voltage is for reference only.

Note3: Optical performance should be evaluated at Ta=25℃ only If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.





### 4.3 Power Supply Current

AGND=GND=0V, Ta = 25°C

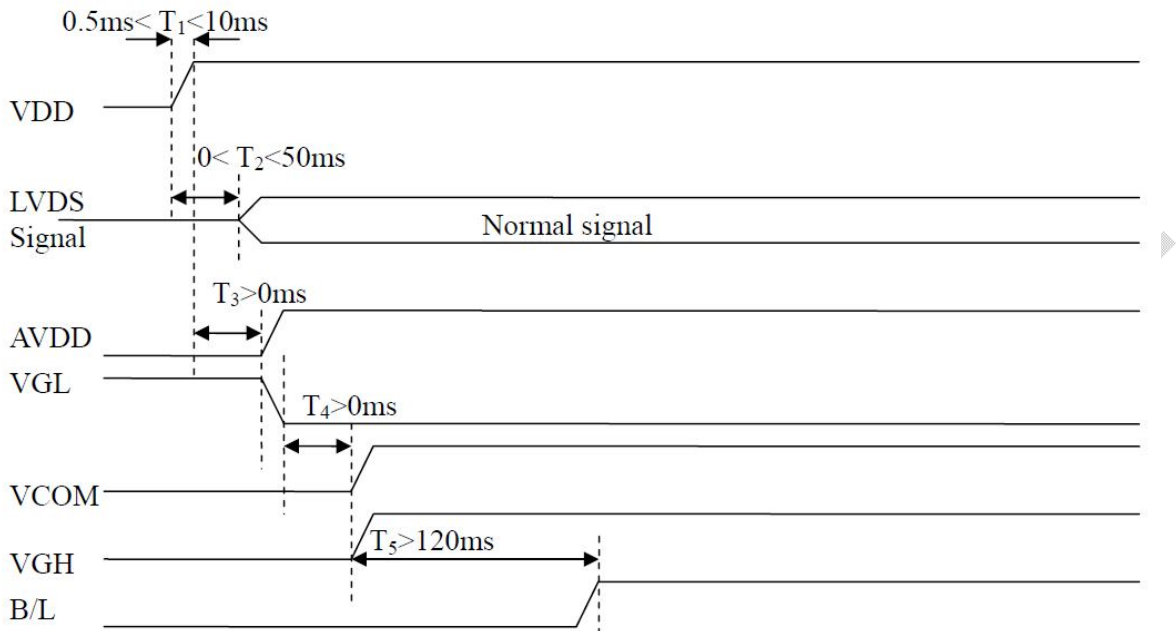
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Power Supply Current	$I_{DVDD}$	VCC=3.3V	-	54.1	65	mA	
	$I_{AVDD}$		-	47.6	55	mA	
	$I_{VGH}$		-	663	700	uA	
	$I_{VGL}$		-	663	700	uA	
	$I_{VCOM}$			2	3	uA	

**NOTES: White picture, frame rate 60Hz.**

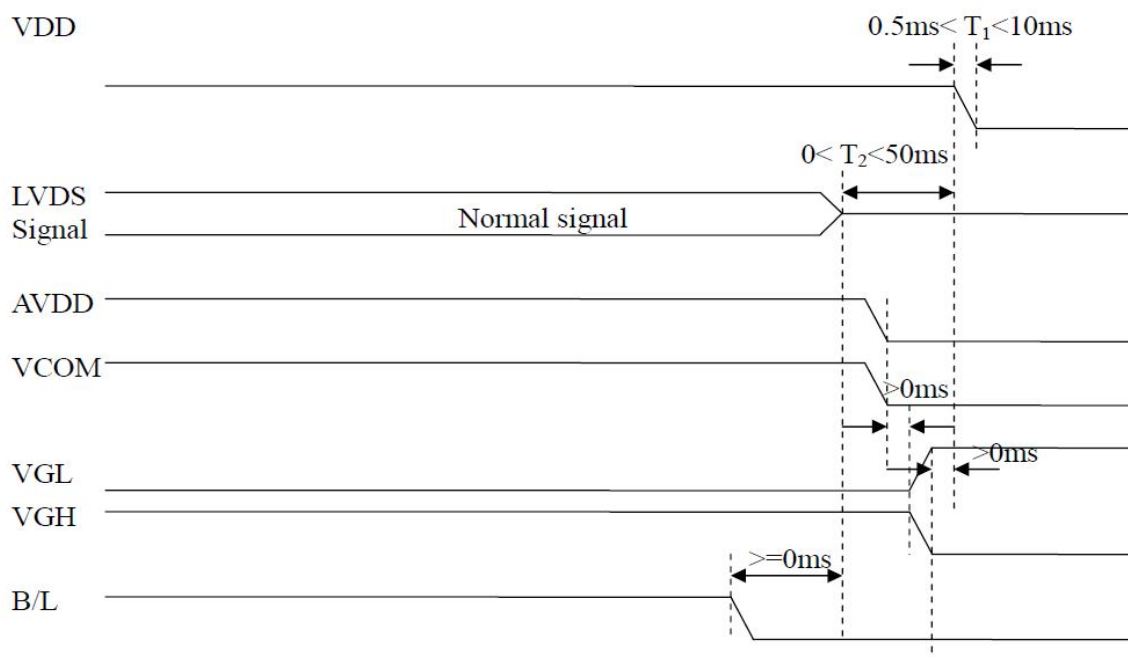
## 5 Timing Chart

### 5.1 Power sequence

#### Power on



#### Power off

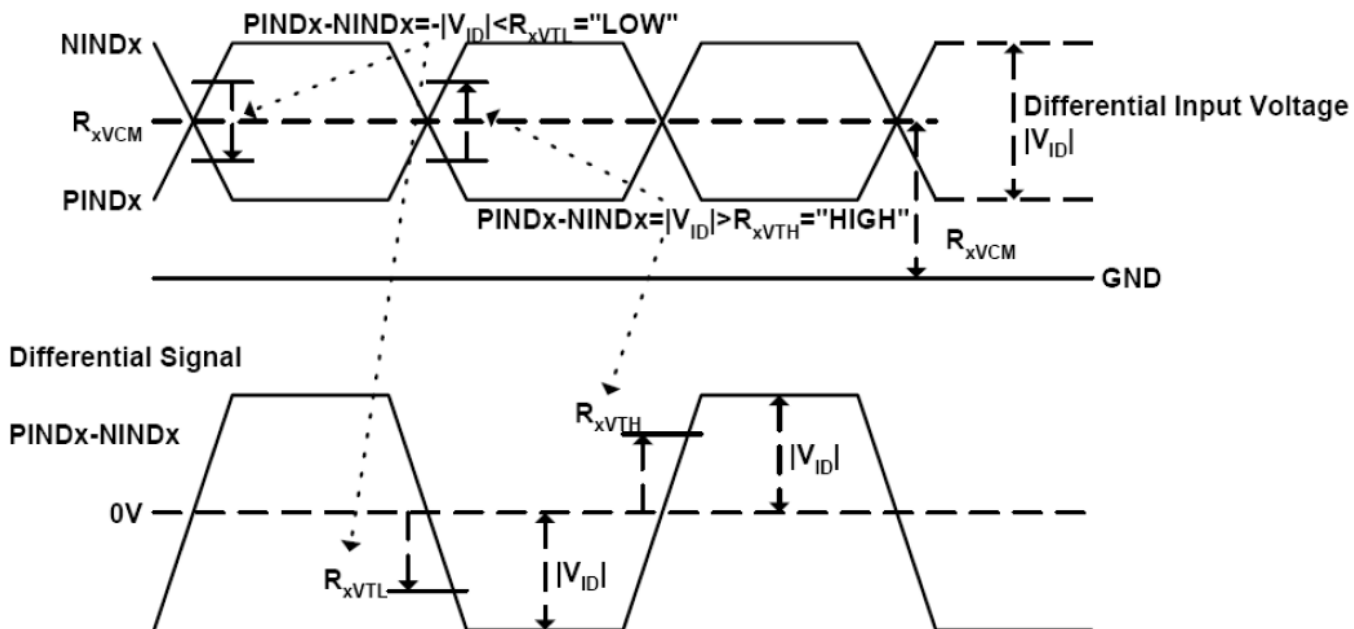


## 5.2 LVDS signal timing characteristic

### Electrical characteristics

Parameter	Symbol	Value			Unit	Note
		min	typ	max		
LVDS differential input high threshold voltage	$R_{xVTH}$	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS differential input low threshold voltage	$R_{xVTL}$	-100	-	-	mV	
LVDS differential input common mode voltage	$R_{xVCM}$	0.7	1.2	1.6	V	
LVDS differential voltage	$V_{ID}$	200	-	600	mV	

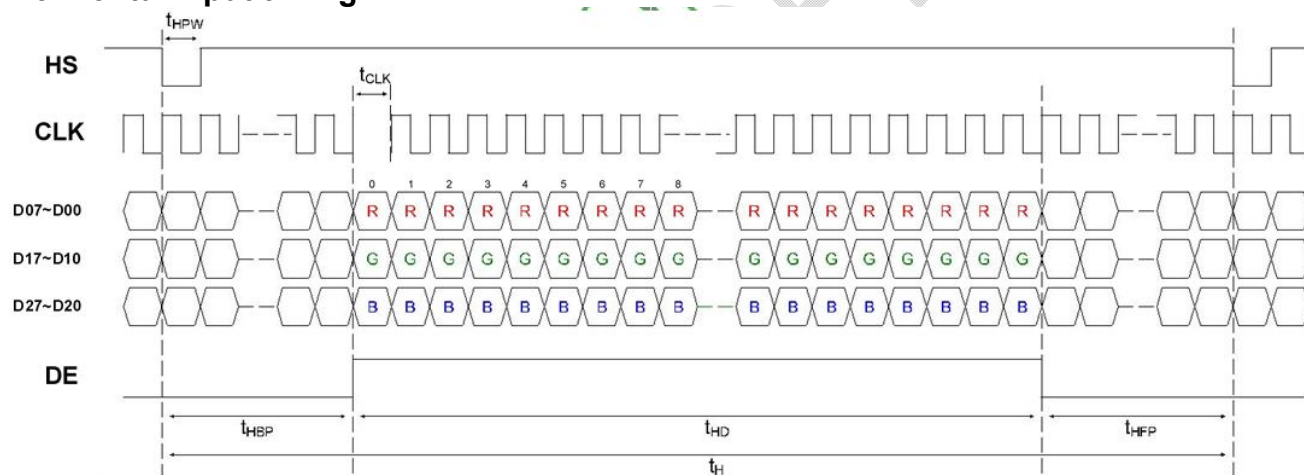
#### Single-end Signals



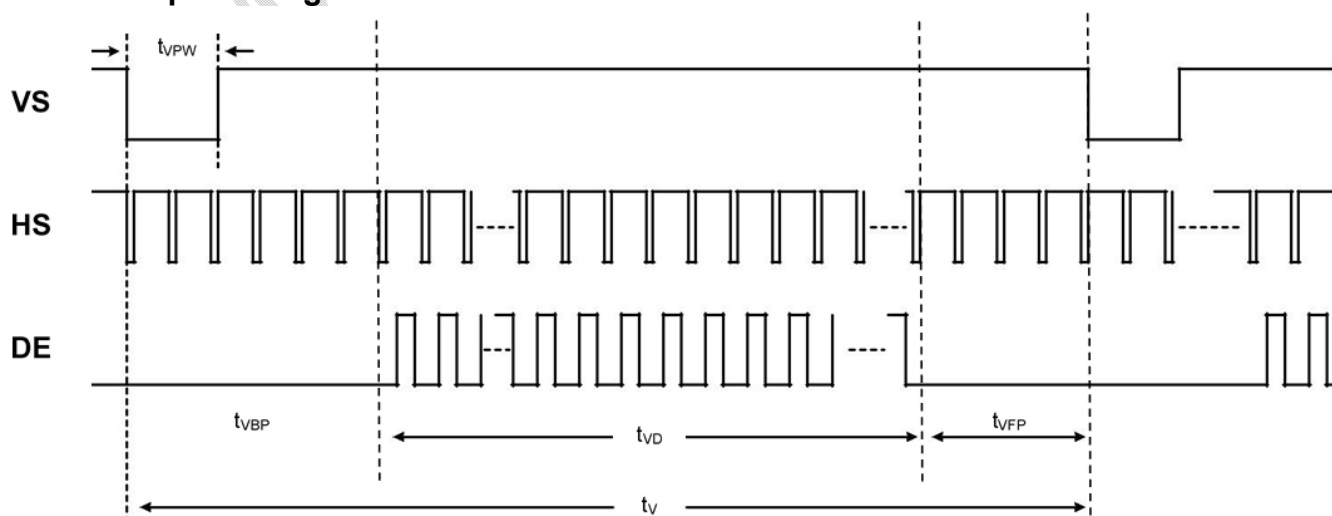
### 5.3 Timing table

Parameter	Symbol	Value			Unit	Note
		min	typ	max		
CLK frequency	$t_{clk}$	62.6	68.2	78.1	Mhz	
Horizontal blanking time	$t_{HBT}$	20	69	164	$t_{clk}$	$t_{hbp} + t_{HFP}$
Horizontal black porch	$t_{HBP}$	5	5	164- $t_{HFP}$	$t_{clk}$	
Horizontal display area	$t_{HD}$	1280	1280	1280	$t_{clk}$	
Horizontal front porch	$t_{HFP}$	15	64	159	$t_{clk}$	
Horizontal period	$t_H$	1300	1349	1444	$t_{clk}$	
Horizontal pulse width	$t_{HPW}$	1	1	256	$t_{clk}$	
Vertical blanking time	$t_{VBT}$	5	42	101	$t_H$	$t_{vbp} + t_{VFP}$
Vertical black porch	$t_{VBP}$	2	2	101- $t_{VFP}$	$t_H$	
Vertical display area	$t_{VD}$	800	800	800	$t_H$	
Vertical front porch	$t_{VFP}$	3	40	99	$t_H$	
Vertical period	$t_V$	803	842	901	$t_H$	
Vertical pulse width	$t_{VPW}$	1	1	128	$t_H$	

#### Horizontal input timing



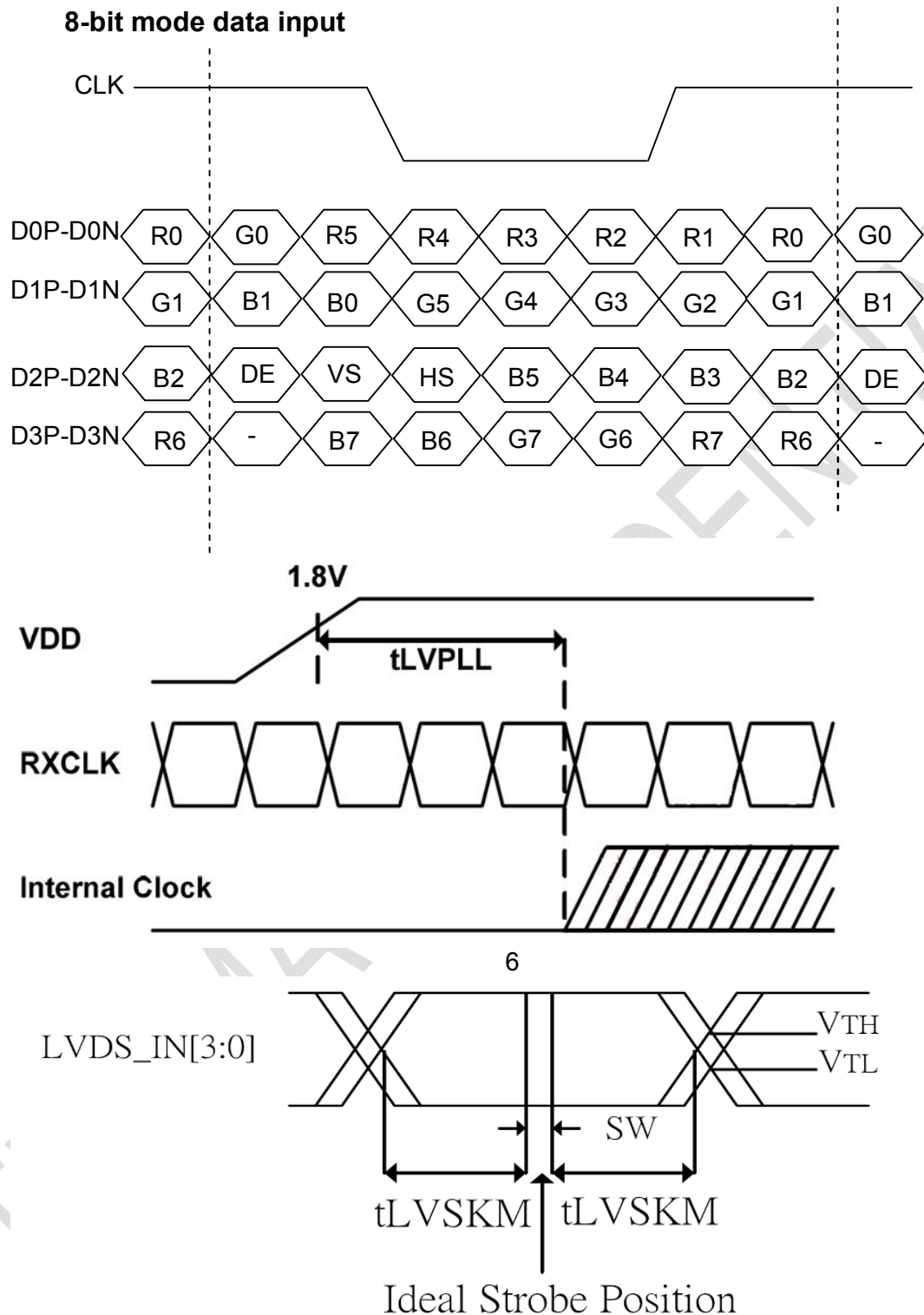
#### Vertical input timing



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## 5.4 LVDS data input format

### 8-bit mode data input



Note1: SW:Setup and hold time

Note2:  $t_{LVSKM}$ =400ps at least.

## 6 Optical Characteristics

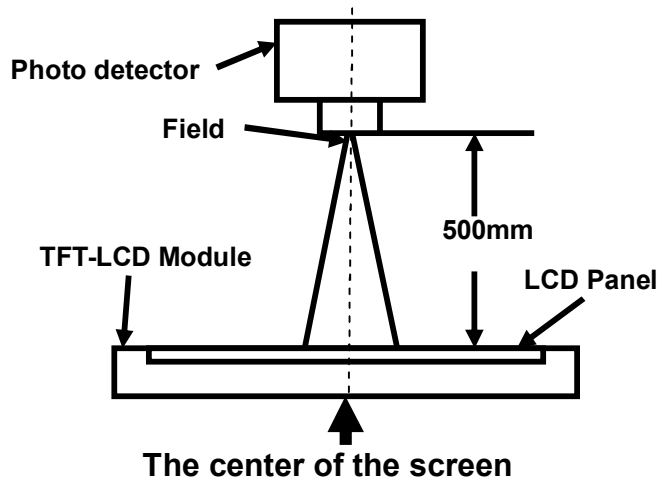
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR ≧ 10	75	85	-	Degree	Note2,3
		θB		75	85	-		
		θL		75	85	-		
		θR		75	85	-		
Contrast Ratio		CR	θ=0°	600	800			Note 3
Response Time		T <sub>ON</sub>	25℃	-	25	50	ms	Note 4
		T <sub>OFF</sub>						
Chromaticity	White	x	Backlight is on	0.250	0.300	0.350		Note 1,5
		y		0.274	0.324	0.374		
	Red	x		0.530	0.580	0.630-		Note 1,5
		y		0.274	0.324	0.374		
	Green	x		0.299	0.349	0.399		Note 1,5
		y		0.538	0.588	0.638		
	Blue	x		0.104	0.154	0.204		Note 1,5
		y		0.045	0.095	0.145		
Uniformity		U		75	80	-	%	Note 6
NTSC				45	50	-	%	Note 5
Luminance		L		350	400	-	cd/m <sup>2</sup>	Note 7

Test Conditions:

1.  $I_F = 220$  mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

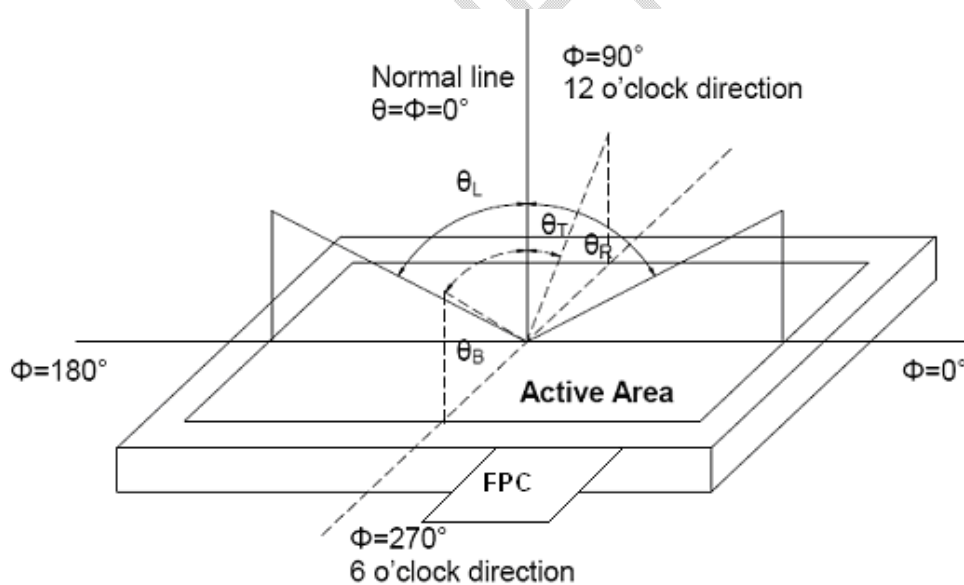
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).



Note 3: Definition of contrast ratio

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

“White state “: The state is that the LCD should drive by  $V_{\text{white}}$ .

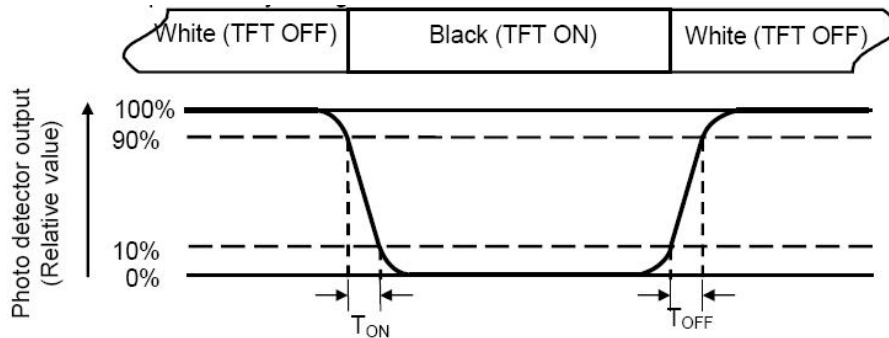
“Black state”: The state is that the LCD should drive by  $V_{\text{black}}$ .

$V_{\text{white}}$ : To be determined       $V_{\text{black}}$ : To be determined.

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#### Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time ( $T_{ON}$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_{OFF}$ ) is the time between photo detector output intensity changed from 10% to 90%.



#### Note 5: Definition of color chromaticity (CIE1931)

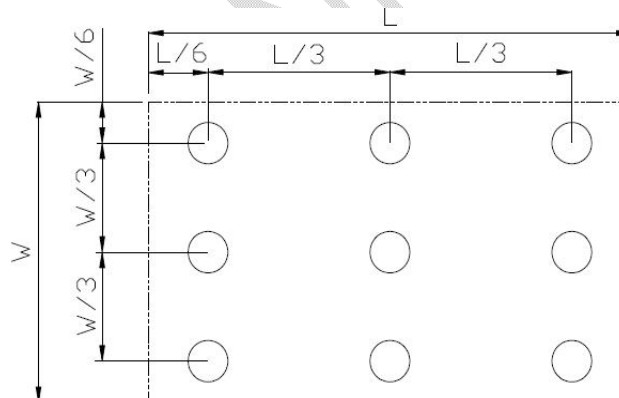
Color coordinates measured at center point of LCD.

#### Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\min} / L_{\max}$$

L-----Active area length W----- Active area width



$L_{\max}$ : The measured Maximum luminance of all measurement position.

$L_{\min}$ : The measured Minimum luminance of all measurement position.

#### Note 7: Definition of Luminance:

Measure the luminance of white state at center point.



## 7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +50℃,120hrs	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta= -10℃,120hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +60℃,120hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -20℃,120 hrs	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+40℃, 90% RH 120 hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-10℃ 30 min~+50℃ 30 min, Change time:5min, 20 Cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,G B2423.22-2002
7	ESD	C=100pF, R=1500Ω,5points/panel Air:± 4KV, 5times, Contact:± 2KV, 5 times, ( Environment: 15℃~35℃, 30%~60%, 86Kpa~106Kpa )	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	Stroke:1.5m Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total)(Package condition)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	100G 6ms, ± X,± Y,± Z 3times, for each direction	IEC60068-2-27:1987 GB/T2423.5—1995

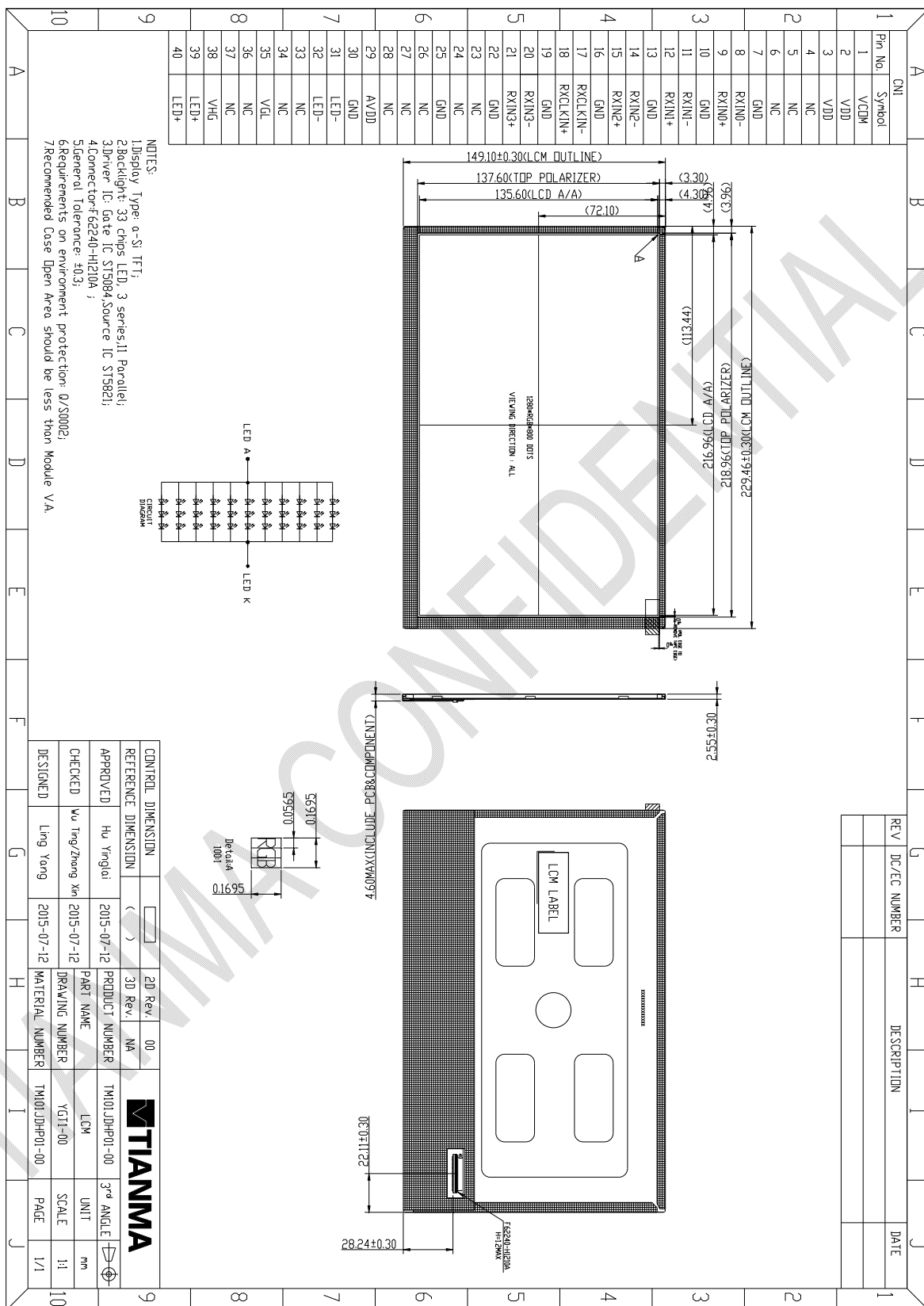
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

# 8 Mechanical Drawing



## 9 Packing Drawing

No	Item	Model (Materiel)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM Module	TM101JDHP01-00	229.46×149.1×2.55mm	0.192	36	
2	Tray	PET (Transmit)	485×330×13.8	0.196	21	
3	Dust-Proof Bag	PE	700×545	0.046	1	
4	BOX	Corrugated Paper	520×345×74	0.369	3	
5	Desiccant	Desiccant	45×50	0.002	6	
6	Carton	Corrugated Paper	544×365×250	0.76	1	
7	Label	Label	100*52	0.001	1	
8	EPE	EPE	349.4*228.06*1.0	0.0013	18	
9	Total Weight	13kg+-5%				

Two Desiccants  
放2包干燥剂

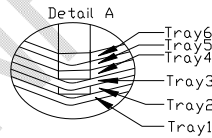
+  
Use empty tray  
使用一个空吸塑盘做盖子

+  
Put products into the 6  
trays\*2 LCMS per  
tray, put one EPE on the  
LCM.  
将产品放入6个吸塑盘中, 每个吸塑盘  
中放入2片模组, 模组上方放1张EPE.

Use strap  
如右图方式打包吸塑盘组

12LCMs per Box  
将打包后的吸塑盘组放入纸盒中  
每盒中共12片模组

3 Box  
内箱中共3盒产品



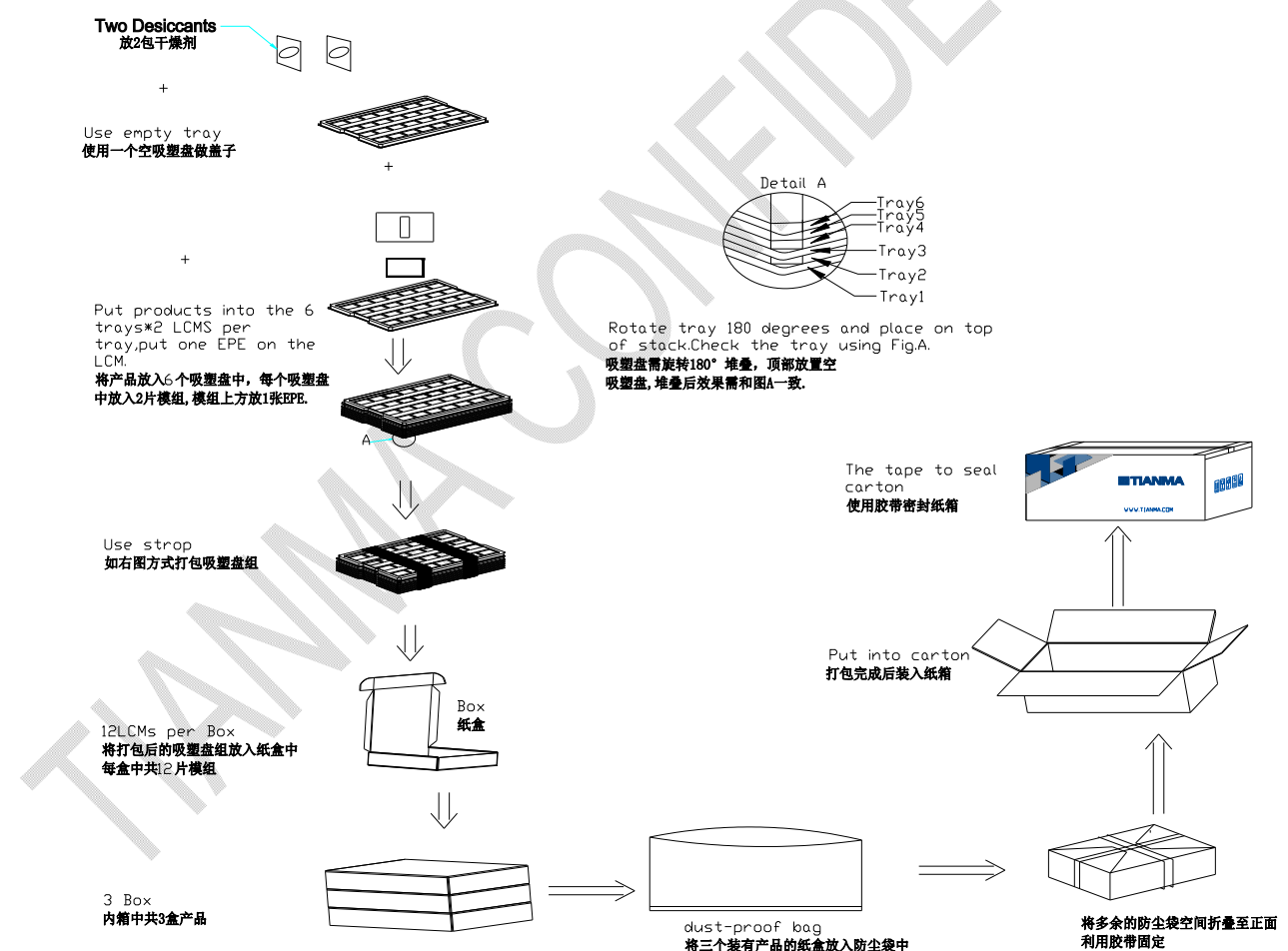
Rotate tray 180 degrees and place on top  
of stack. Check the tray using Fig.A.  
吸塑盘需旋转180° 堆叠, 顶部放置空  
吸塑盘, 堆叠后效果需和图A一致。

The tape to seal  
carton  
使用胶带密封纸箱

Put into carton  
打包完成后装入纸箱

dust-proof bag  
将三个装有产品的纸盒放入防尘袋中

将多余的防尘袋空间折叠至正面  
利用胶带固定



## **10 Precautions for Use of LCD Modules**

### **10.1 Handling Precautions**

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

10.1.2 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.

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

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

10.1.5 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

10.1.6 Do not attempt to disassemble the LCD Module.

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

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 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.

### **10.2 Storage precautions**

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

10.2.2 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℃ ~ 40℃ Relatively humidity: ≤80%

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

### **10.3 Transportation Precautions**

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