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# Datasheet

## Tianma

TM%\$%JHG3&0%

TI-Î €-00î

**MODEL NO :** TM101JVHG32

**MODEL VERSION:** 01

**SPEC VERSION :** V1.0

**ISSUED DATE:** 2018-01-23

- Preliminary Specification**
- Final Product Specification**

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

Approved by	Notes

**TIANMA Confirmed :**

Prepared by	Checked by	Approved by
Dongliang Xie	Feng Tan	Kevin Kim

This technical specification is subjected to change without notice

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## Record of Revision

Rev	Issued Date	Description	Editor
1.0	2018-01-23	Preliminary Specification Released.	Dongliang Xie

## 1 General Specifications

Feature		Spec
<b>Display Spec.</b>	Size	10.1 inch
	Resolution	1280(RGB) x 800
	Technology Type	SFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel Pitch (mm)	0.1695x0.1695
	Display Mode	TM with Normally Black
	Surface Treatment(Up Polarizer)	HC
	Viewing Direction	All direction
<b>Mechanical Characteristics</b>	LCM (W x H x D) (mm)	LCM: 229.80x149.0
		CTP+LCM: 258.66x177.30x12.45
	Active Area(mm)	TFT LCD:216.96x135.60
		CTP: 220.36x139.00
	CTP Structure	G+G (DITO)
	CTP Touch Method	PCAP
	Number of simultaneous touches	≤ 5 points @ 7mm copper cylinders
	Minimum Touch Area	Φ 7mm
	Finger Touch Pitch	≥2.5xpitch
	With /Without TSP	With CTSP
Matching Connection Type	CN1:JAE FI-SE20P-HFE-E3000 CN2: JAE FI-S6P-HFE-E1500 CN3:MOLEX 53261-0871	
Weight (g)	TBD	
<b>Electrical Characteristics</b>	Interface	TFT: LVDS, 6/8bit selectable
		CTP:USB
	Color Depth	262K/16.7M
	Driver IC	TFT:ST5084*1,ST5821*3
CTP:ILI2511		

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

Note 3: LCM weight tolerance: +/- 5%

## 2 Input/Output Terminals

### 2.1 TFT LCD Panel

Connector type: CN1:JAE FI-SE20P-HFE-E3000

CN2: JAE FI-S6P-HFE-E1500 CN3:MOLEX 53261-0871

No	Symbol	I/O	Description	Comment
CN1				
1	IND3+	I	Positive LVDS Differential data input(3)	
2	IND3-	I	Negative LVDS Differential data input(3)	
3	NC	-	No Connection	
4	SEL6/8	I	6bit/8bit mode select H : 6-bit mode L : 8-bit mode	
5	VSS	P	Power Ground	
6	PINC	I	Positive LVDS Differential clock input	
7	NINC-	I	Negative LVDS Differential clock input	
8	VSS	P	Power Ground	
9	IND2+	I	Positive LVDS Differential data input(2)	
10	IND2-	I	Negative LVDS Differential data input(2)	
11	VSS	P	Power Ground	
12	IND1+	I	Positive LVDS Differential data input(1)	
13	IND1-	I	Negative LVDS Differential data input(1)	
14	VSS	P	Power Ground	
15	IND0+	I	Positive LVDS Differential data input(0)	
16	IND0-	I	Negative LVDS Differential data input(0)	
17	VSS	P	Power Ground	
18	NC	-	No Connection	
19	VDD	P	Power Supply	
20	VDD	P	Power Supply	
CN2				
1	VLED	P	Backlight power supply	
2	VLED	P	Backlight power supply	
3	VLSS	P	VLED Ground	
4	VLSS	P	VLED Ground	
5	LED_EN	I	Backlight on/off control	
6	LED_PWM	I	Backlight dimming control	
CN3				
1	VDD1	P	Power for ctp	
2	D-	I/O	USB data- pin	
3	D+	I/O	USB data+ pin	
4	VSS1	P	Power Ground	
5	NC	-	No Connection	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	NC	-	No Connection	

Note: I/O definition: I----Input O-----output P----Power/Ground

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### 3 Absolute Maximum Ratings

#### 3.1 Driving TFT LCD Panel

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Voltage Input	VDD	-0.50	5.00	V	Note1
Operating Temperature	T <sub>op</sub>	-20.0	70.0	°C	
Storage Temperature	T <sub>st</sub>	-30.0	80.0	°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 3.1 absolute maximum rating**

Note1: Input voltage include Rxin0-/+ , Rxin1-/+ , Rxin2-/+ , Rxin3-/+ , RxCLK-/+ , SEL6/8,VDD.

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.

#### 3.2 CTP absolute Maximum Ratings

Item	Symbol	Min.	Max	Unit	Remark
Input Voltage	VDD1	-0.3	5.5	V	
Operating Temperature	T <sub>OPR</sub>	-20	70	°C	
Storage Temperature	T <sub>STG</sub>	-30	80	°C	

**Table 3.2 CTP absolute Maximum Ratings**



## 4 Electrical Characteristics

### 4.1 Driving TFT LCD Panel

VDD=3.3V,GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply Voltage	VDD	3.00	3.30	3.60	V	
Power supply ripple	Vp-p	-	-	100	mV	
Power supply current	IDD	-	280	-	mA	
Power consumption	P	-	924	-	mW	Note1
Differential input voltage	Vid	200	-	600	mV	
Differential input common voltage	Vcom	-	1.2	-	V	
Differential input threshold voltage	Low level	VTL	-100	-	-	mV
	High level	VTH	-	-	100	mV
Inrush current	Irush	-	-	1.5	A	

Table 4.1 LCD module electrical characteristics

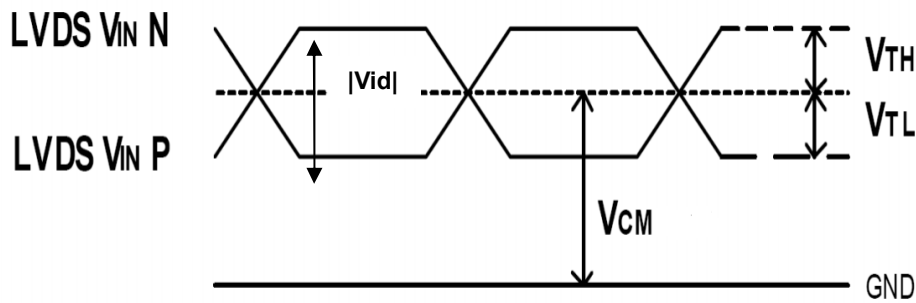


Figure4.1 LVDS DC characteristics

Note1: To test the current dissipation, using the “color bar” testing pattern shown as below:

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

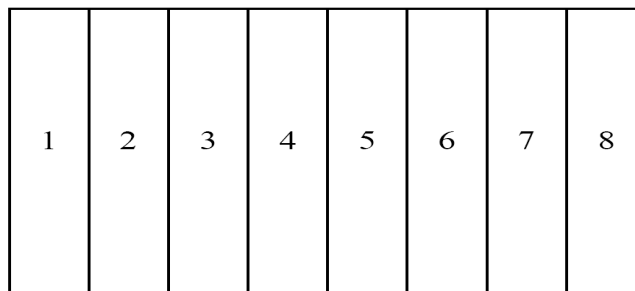


Figure 4.1.2 Current dissipation testing pattern

**4.2 CTP recommended Operating Condition**

 (T<sub>A</sub>= 25°C,VDD1=5.0V)

Item	Min	Typ	Max	Unit	Note
Power supply voltage	4.7	5.0	5.3	V	
IO voltage	4.7	5.0	5.3	V	1
Operating mode current	--	TBD	100	mA	2

Note1: If there are other voltage requirements, can be realized by changing the design, the adjustable range is 4.7V to 5.3V.

Note2: All current measurement is average current at Operating mode.  
condition (T<sub>a</sub>=25°C,VDD1=5V)

No.	Item	Specification	NOTE
1	Linearity	±1.5mm at the center · 2.0mm at the border	Copper stick Φ7
2	Veracity	±1.5mm at the center · 2.0mm at the border	Copper stick Φ7
3	Sensitivity	±1.5mm at the center · 2.0mm at the border	Copper stick Φ7

**4.3 Driving Backlight**

 T<sub>a</sub>=25°C

Item	Symbol	Min	Typ	Max	Unit	Remark	
Backlight power supply voltage	VLED	11.5	12	12.5	V		
Backlight power supply current	I_LED	-	680	-	mA		
Backlight power consumption	P_LED	-	8160	-	mW		
Input voltage for VLED_PWM signal	High level	-	2.0	-	5.0	V	
	Low level	-	0	-	0.4	V	
Input voltage for VLED_EN	High level	-	2.0	-	5.0	V	
	Low level	-	0	-	0.4	V	
VLED_PWM frequency	Fpwm	200	-	10k	HZ		
VLED_PWM duty	D	0.2		100	%	Note1	
Operating Life Time	--	--	50000	--	hrs	Note2	

Note 1: According to LED driver IC characteristics, the minimum value of VLED\_PWM duty may vary with VLED\_PWM frequency, higher the frequency, bigger the duty.

Note 2: Optical performance should be evaluated at T<sub>a</sub>=25°C only.

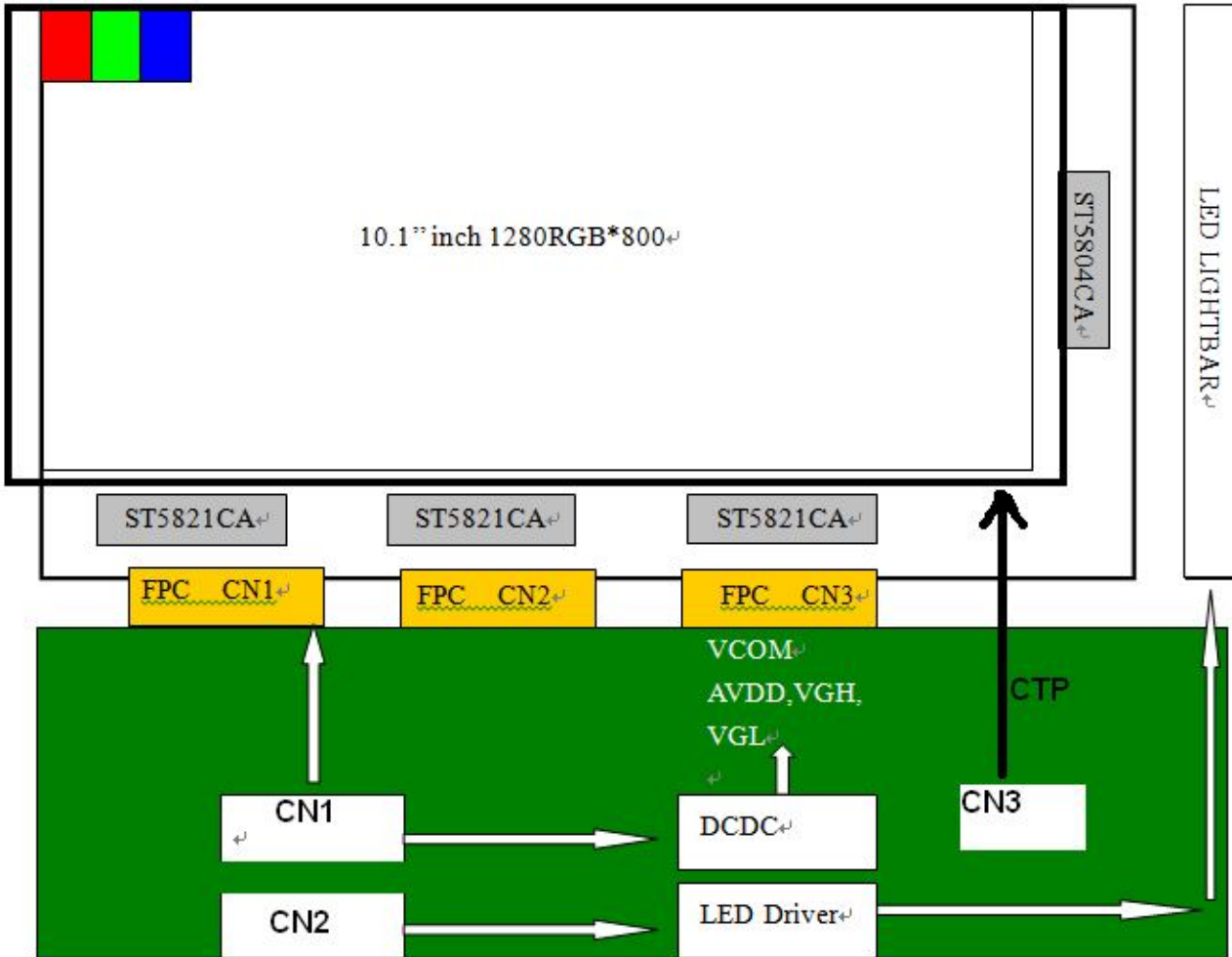
If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.

Operating life means brightness goes down to 50% of initial brightness.

Typical operating life time is estimated data.

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4.4 Block Diagram



## 5 Timing Chart

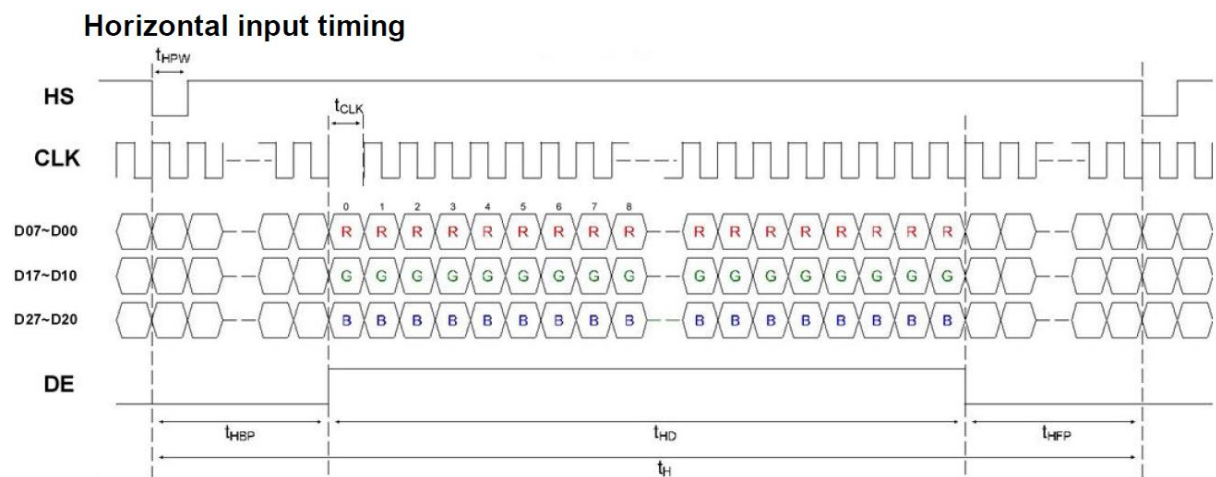
### 5.1 LVDS signal timing characteristics

VDD=3.3V, GND=0V, Ta=25°C

Parameter	Symbol	Min	Typ	Max	Unit	Remark
CLK frequency	$1/t_{clk}$	62.6	68.2	78.1	MHz	
Horizontal blanking time	$t_{HBT}$	20	69	164	tclk	$t_{hbp} + t_{HFP}$
Horizontal back porch	$t_{HBP}$	-	5	$164 - t_{HFP}$	tclk	
Horizontal display area	$t_{HD}$	-	1280	-	tclk	
Horizontal front porch	$t_{HFP}$	15	64	159	tclk	
Horizontal period	$t_H$	1300	1349	1444	tclk	
Horizontal pulse width	$t_{HPW}$	-	1	256	tclk	
Vertical blanking time	$t_{VBT}$	5	42	101	tH	$t_{vbp} + t_{VFP}$
Vertical back porch	$t_{VBP}$	-	2	$101 - t_{VFP}$	tH	
Vertical display area	$t_{VD}$	-	800	-	tH	
Vertical front porch	$t_{VFP}$	3	40	99	tH	
Vertical period	$t_V$	803	842	901	tH	
Vertical pulse width	$t_{VPW}$	-	1	128	tH	
Frame Rate	F	-	60	-	HZ	

Table 5.1 timing parameter

### 5.2 Input Clock and Data timing Diagram:



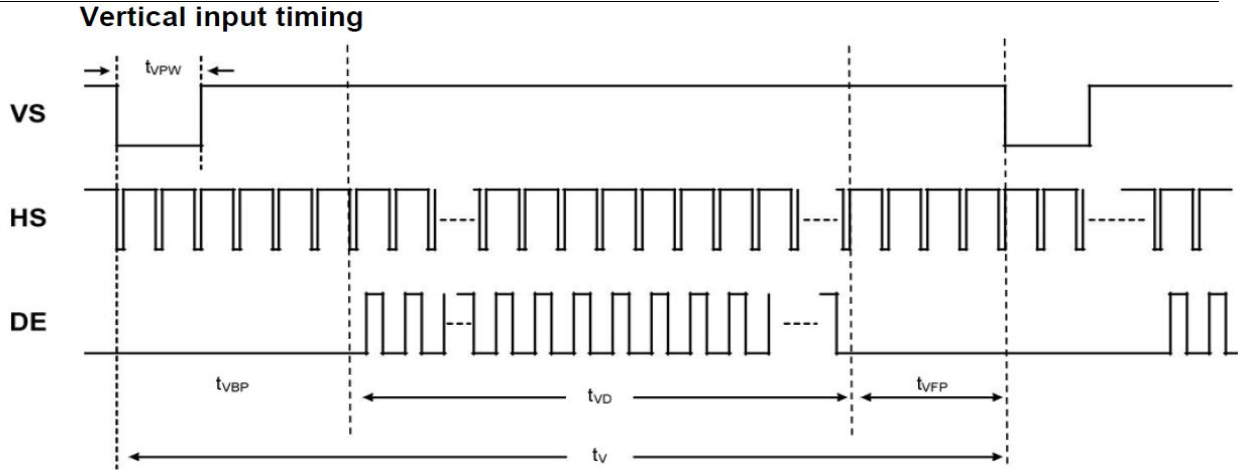
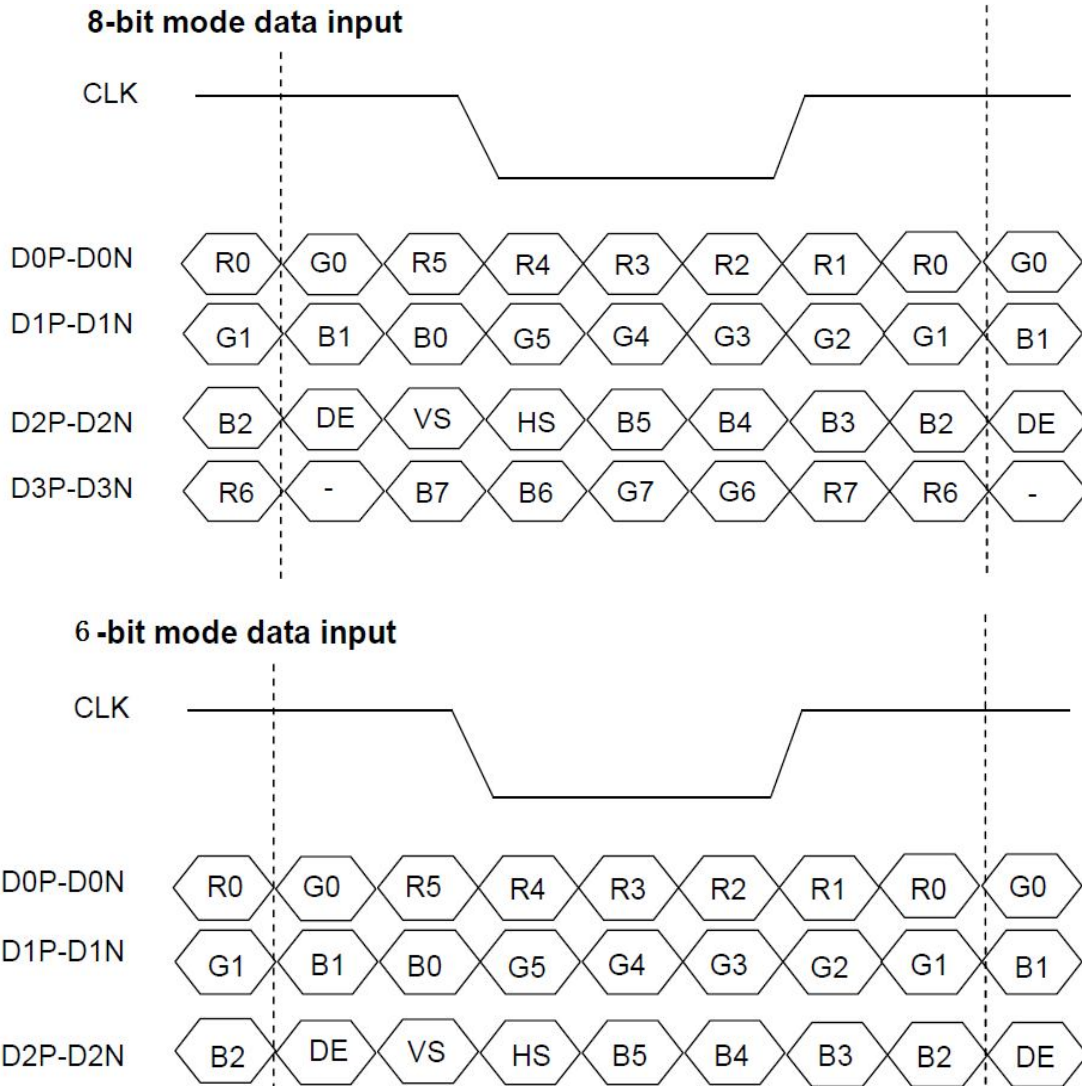


Figure 5.2 Input signal data timing

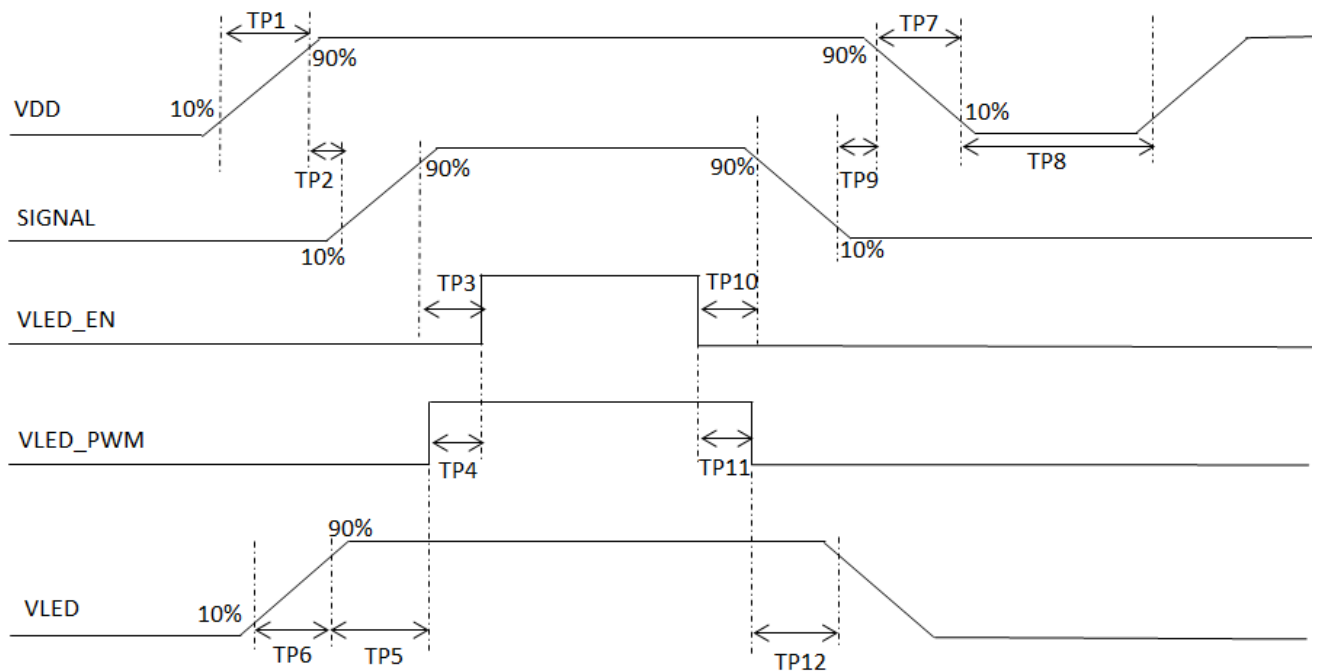
**5.3 LVDS data input format**



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**5.4 Power On/Off Sequence**

Item	Symbol	Min	Typ	Max	Unit	Remark
VDD on to VDD stable	Tp1	0.5	-	10	ms	
VDD stable to signal on	Tp2	0	-	50	ms	
Signal on to VLED_EN on	Tp3	200	-	-	ms	
PWM on to VLED_EN on	Tp4	0	-	200	ms	
VLED to PWM on	Tp5	10	-	-	ms	
VLED on to VLED stable	Tp6	0.5	-	10	ms	
VDD off time	Tp7	0	-	10	ms	
VDD off to next VDD on	Tp8	500	-	-	ms	
Signal off before VDD off	Tp9	0	-	50	ms	
VLED_EN off before signal off	Tp10	200	-	-	ms	
VLED_EN off before PWM off	Tp11	0	-	200	ms	
PWM off before VLED off	Tp12	10	-	-	ms	

**Table 5.4 Power on/off sequence**

**Figure 5.4 Interface power on/off sequence**

## 6 Optical Characteristics

Ta=25°C

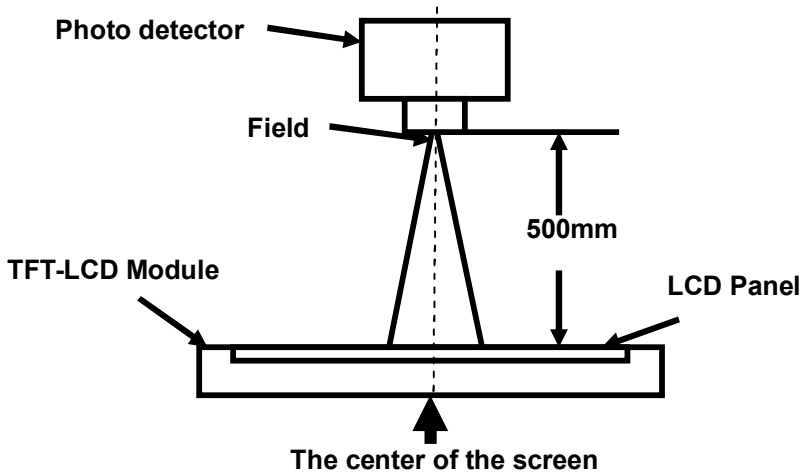
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	
View Angles	$\theta T$	$CR \geq 10$	75	85	-	Degree	Note 2	
	$\theta B$		75	85	-			
	$\theta L$		75	85	-			
	$\theta R$		75	85	-			
Contrast Ratio	CR	$\theta=0^\circ$	500	700	-	-	Note1 Note3	
Response Time	$T_{ON}+T_{OFF}$	25°C	-	25	40	ms	Note1 Note4	
Chromaticity	White	x	Backlight is on	0.252	0.302	0.352	-	Note5 Note1
		y		0.277	0.327	0.377		
	Red	x		0.532	0.582	0.632		
		y		0.274	0.324	0.374		
	Green	x		0.300	0.350	0.400		
		y		0.532	0.582	0.632		
	Blue	x		0.104	0.154	0.204		
		y		0.044	0.094	0.144		
Uniformity	U	-	75	80	-	%	Note1 Note6	
NTSC	-	-	45	50	-	%	Note 5	
Luminance	L		700	850	-	cd/m <sup>2</sup>	Note1 Note7	

Test Conditions:

1. The ambient temperature is  $25 \pm 2^\circ\text{C}$ . humidity is  $65 \pm 7\%$
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.

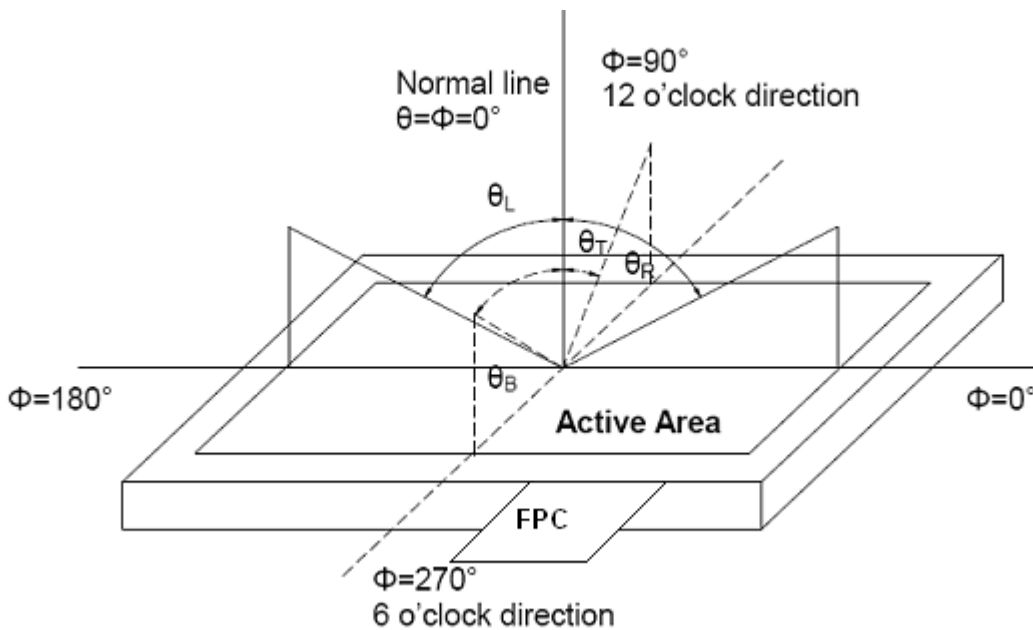


Fig. 1 Definition of viewing angle



Note 3: Definition of contrast ratio

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

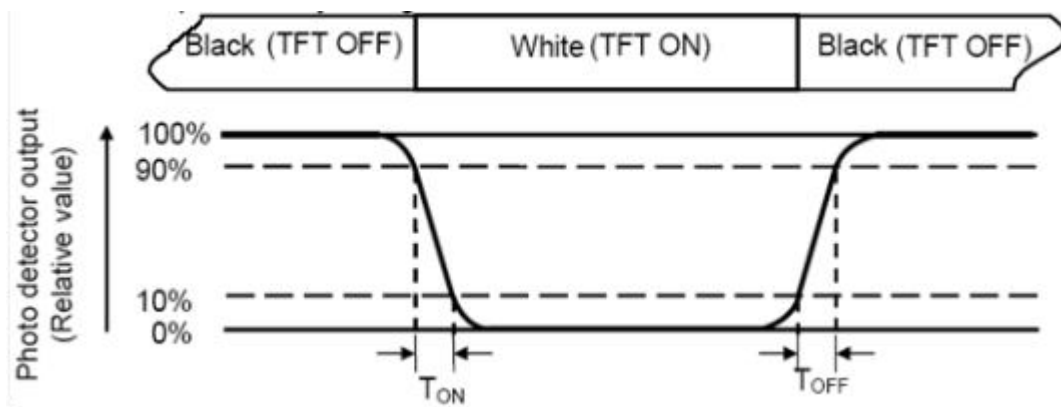
“White state “:The state is that the LCD should driven by Vwhite.

“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined    Vblack: To be determined.

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 (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 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.

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

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

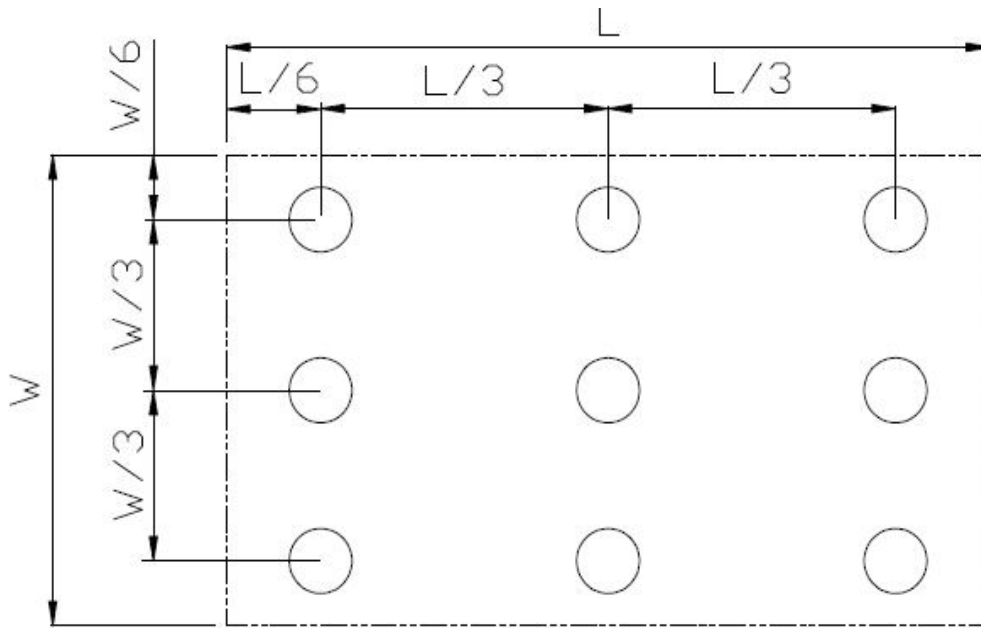


Fig. 2 Definition of uniformity

$L_{max}$ : 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	Remark
1	High Temperature Operation	Ts=+70°C, 240hrs	(Note1) IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta=-20°C, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage (non-operation)	Ta=+80°C, 240hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage (non-operation)	Ta=-30°C, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & High Humidity Operation	Ta = +60°C, 90% RH max,240 hours	(Note2) IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30°C 30 min~+80°C 30 min, Change time:5min,100cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	Electro Static Discharge (operation)	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15°C~35°C, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Package Drop Test	Height: TBD cm 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

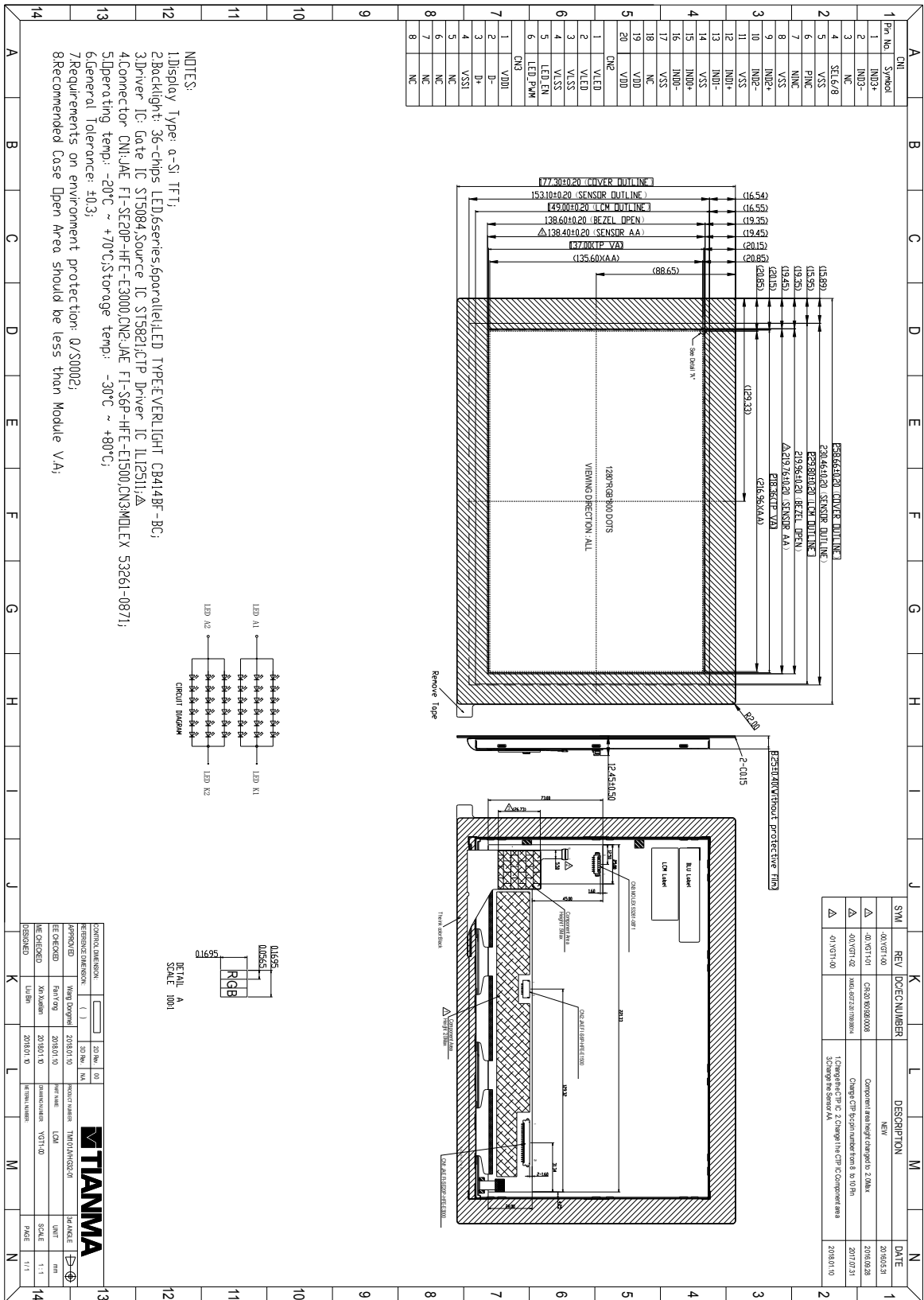
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 24 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



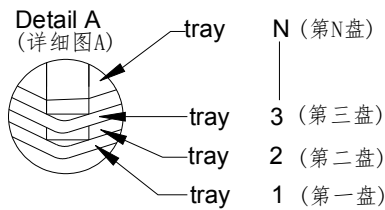
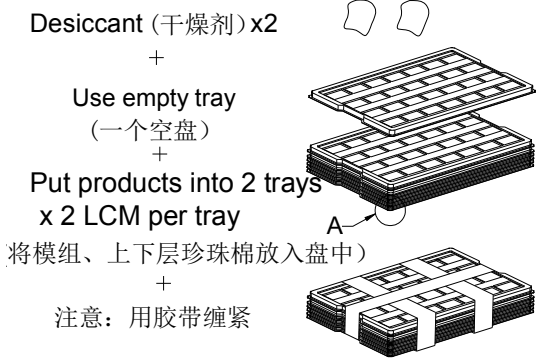
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**9 Packing Drawing**

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101JVHG32-01	258.66x177.3x12.45	TBD	12	
2	Tray	PET(Transmit)	485×330×21mm	0.224	9	
3	EPE	EPE	485X330X5mm	0.0195	3	
4	Vacuum Bag	PE	600×500×0.08mm	0.05	3	
5	BOX	Corrugated Paper	520×345×74mm	0.3879	3	
6	Desiccant	Desiccant	45×35mm	0.002	6	
7	Label	Paper	100×52mm	0.0001	1	
8	Carton	Corrugated paper	544×365×250mm	1.01	1	
9	Pearl cotton	TM101JVHG32-00 YPF1-00	291.29×247.66×1	0.0013	6	
10	Pearl cotton	TM101JVHG32-00 YPF2-00	393.79×257.46×1	0.002	6	
11	Total weight(Kg)	TBD kg ± 5%				

The packing method is shown as below:

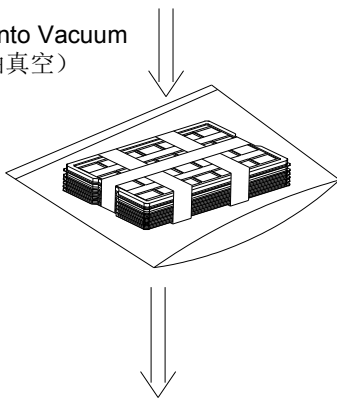
**9.1 Dummy packing assembling**



Rotate tray 180 degrees and place on top of stack. Check the tray using Fig.A.

(旋转盘180° 并放在堆叠盘上面, 按图A检查盘是否错开放置。)

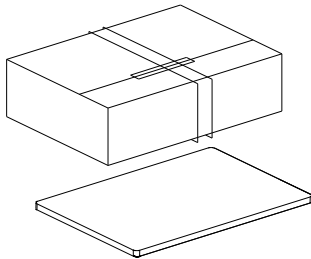
3 Trays into Vacuum bag (不抽真空)



Use strap  
 (用胶带固定)

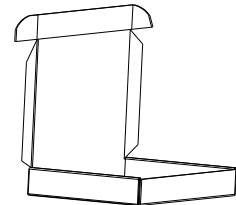
+

EPE(珍珠棉)

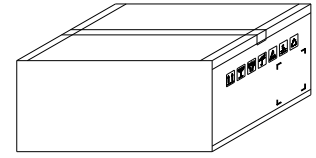


Put into box  
 (放入彩盒中)

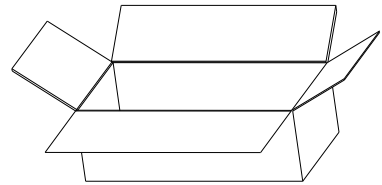
box(彩盒)



The tape to seal carton  
 (胶带密封纸箱)



carton  
 (纸箱)

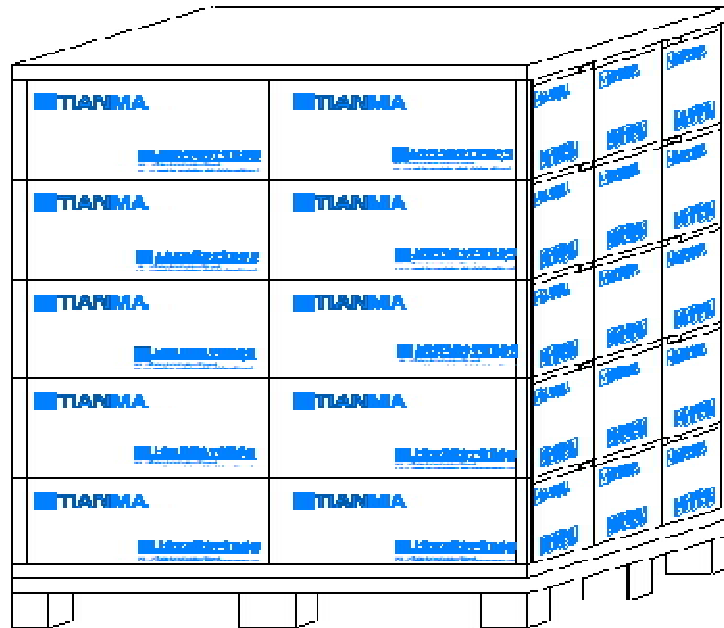


Put into carton  
 3x2x2=12 LCM  
 per Carton  
 (放入纸箱中)

3 box  
 (3盒模组)



9.2 Stacking method(2x3x5)



## **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 alcoholSolvents 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°C ~ 40°C      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**

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



Our company network supports you worldwide with offices in Germany, Austria, Switzerland, the UK and the USA. For more information please contact:

## Headquarters

Germany



**FORTEC Elektronik AG**

Lechwiesenstr. 9  
86899 Landsberg am Lech

Phone: +49 8191 91172-0  
E-Mail: [sales@forteca.de](mailto:sales@forteca.de)  
Internet: [www.forteca.de](http://www.forteca.de)

## Fortec Group Members

Austria



**FORTEC Elektronik AG**

**Office Vienna**

Nuschinggasse 12  
1230 Wien

Phone: +43 1 8673492-0  
E-Mail: [office@fortec.at](mailto:office@fortec.at)  
Internet: [www.fortec.at](http://www.fortec.at)

Germany



**Distec GmbH**

Augsburger Str. 2b  
82110 Germering

Phone: +49 89 894363-0  
E-Mail: [info@distec.de](mailto:info@distec.de)  
Internet: [www.distec.de](http://www.distec.de)

Switzerland



**ALTRAC AG**

Bahnhofstraße 3  
5436 Würenlos

Phone: +41 44 7446111  
E-Mail: [info@altrac.ch](mailto:info@altrac.ch)  
Internet: [www.altrac.ch](http://www.altrac.ch)

United Kingdom



**Display Technology Ltd.**

Osprey House, 1 Osprey Court  
Hichingbrooke Business Park  
Huntingdon, Cambridgeshire, PE29 6FN

Phone: +44 1480 411600  
E-Mail: [info@displaytechnology.co.uk](mailto:info@displaytechnology.co.uk)  
Internet: [www.displaytechnology.co.uk](http://www.displaytechnology.co.uk)

USA



**Apollo Display Technologies, Corp.**

87 Raynor Avenue,  
Unit 1 Ronkonkoma,  
NY 11779

Phone: +1 631 5804360  
E-Mail: [info@apolloDisplays.com](mailto:info@apolloDisplays.com)  
Internet: [www.apolloDisplays.com](http://www.apolloDisplays.com)