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Datasheet

Tianma

TM101JDHG32-00

TI-01-003

MODEL NO : TM101JDHG32

MODEL VERSION: 00

SPEC VERSION : V2.0

ISSUED DATE: 2018-06-13

□**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

Table of Contents

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2017-05-12	Preliminary Specification Released.	Dongliang Xie
2.0	2018-06-13	Final Specification Released	Dongliang Xie

1 General Specifications

Feature		Spec
Display Spec.	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
Mechanical Characteristics	LCM (W x H x D) (mm)	LCM：229.80x149.0x9.11
	Active Area(mm)	TFT LCD:216.96x135.60
	Matching Connection Type	CN1:JAE FI-SE20P-HFE-E3000 CN2: JAE FI-S6P-HFE-E1500
	Weight (g)	288.5
Electrical Characteristics	Interface	TFT: LVDS, 6/8bit selectable
	Color Depth	262K/16.7M
	Driver IC	TFT:ST5084*1,ST5821*3

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

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	

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

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_{op}	-20.0	70.0	℃	
Storage Temperature	T_{st}	-30.0	80.0	℃	
Relative Humidity (Note2)	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃＜Ta≤50℃
		--	≤55	%	50℃＜Ta≤60℃
		--	≤36	%	60℃＜Ta≤70℃
		--	≤24	%	70℃＜Ta≤80℃
Absolute Humidity	AH	--	≤70	g/m^3	Ta＞70℃

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.

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

VDD=3.3V,GND=0V, Ta=25℃

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		I_{VDD}	-	300	-	mA	
Power consumption		P	-	990	-	mW	Note1
Differential input voltage		$\|V_{ID}\|$	200	-	600	mV	
Differential input common voltage		RxVCM	-	1.2	-	V	
Differential input threshold voltage	Low level	RxVTL	-100	-	-	mV	
	High level	RxVTH	-	-	100	mV	
Inrush current		Irush	-	-	1.5	A	

Table 4.1 LCD module electrical characteristics

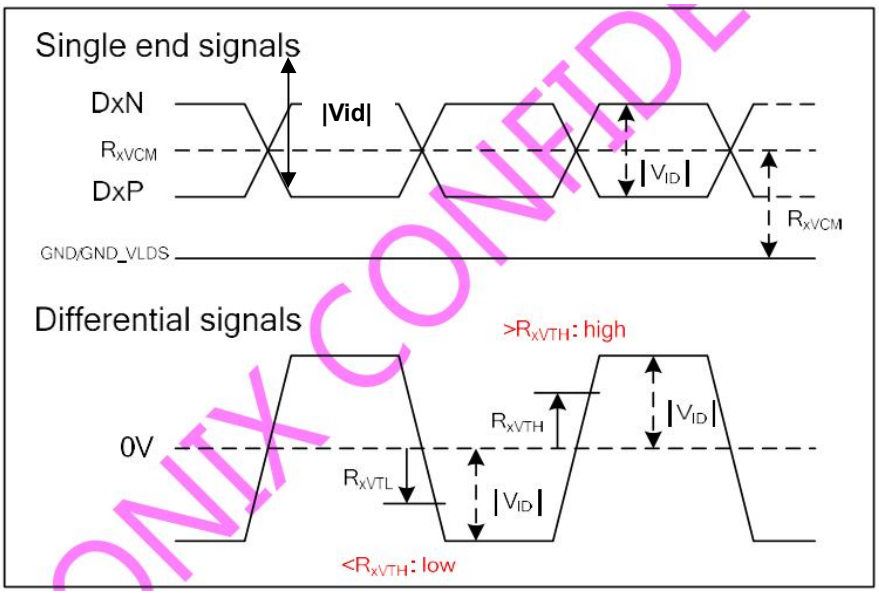


Figure4.1 LVDS DC characteristics

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

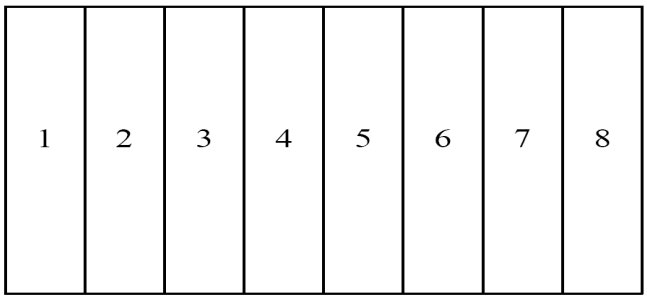


Figure 4.1.2 Current dissipation testing pattern

4.2 Driving Backlight

Ta=25℃

Item		Symbol	Min	Typ	Max	Unit	Remark	
Backlight power supply voltage		VLED	11.5	12	12.5	V		
Backlight power supply current		I_LED	-	550	-	mA		
Backlight power consumption		P_LED	-	6600	-	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 VELD_PWM duty may vary with VLED_PWM frequency, higher the frequency, bigger the duty.

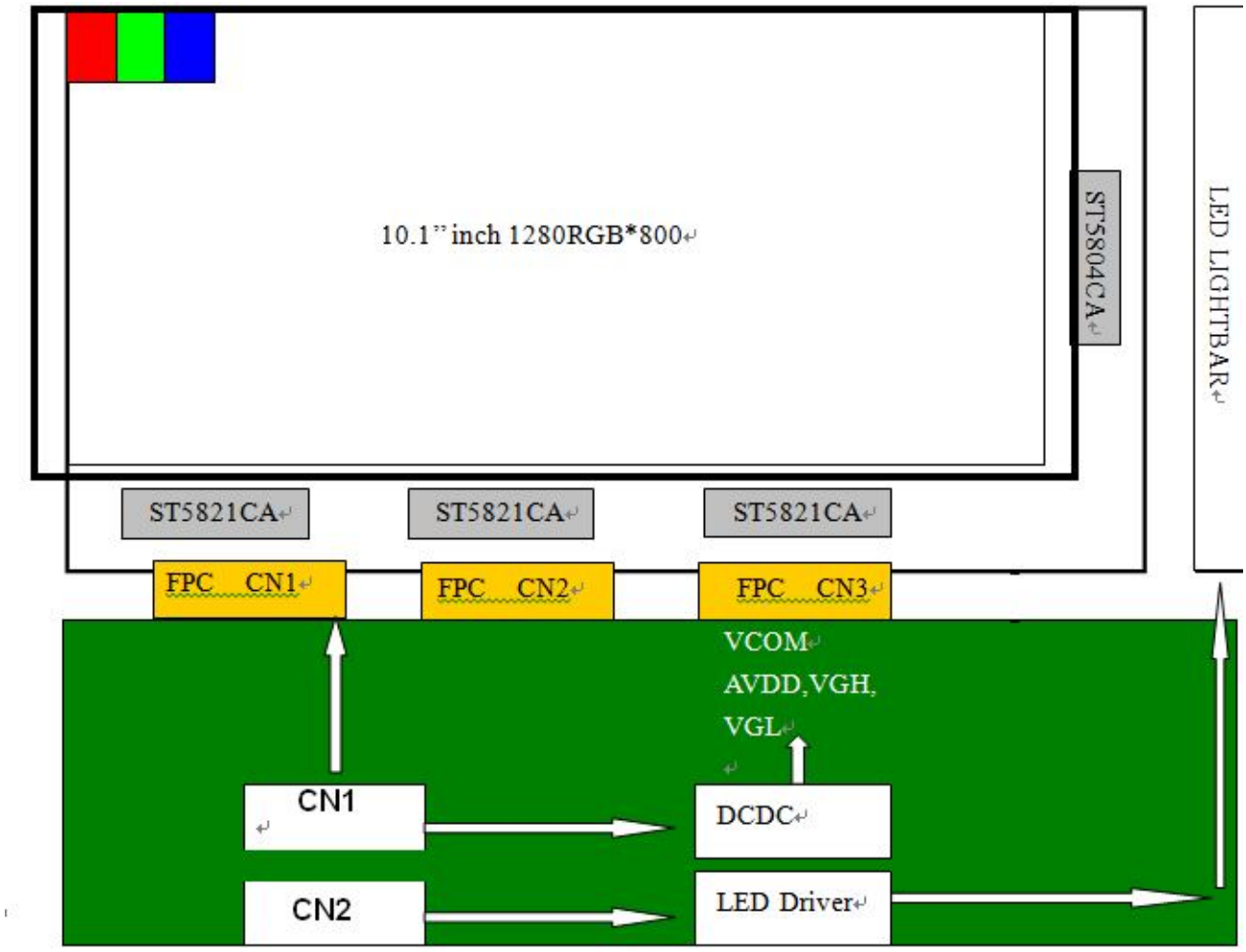
Note 2: Optical performance should be evaluated at Ta=25℃ only.

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% of initial brightness.

Typical operating life time is estimated data.

4.3 Block Diagram



5 Timing Chart

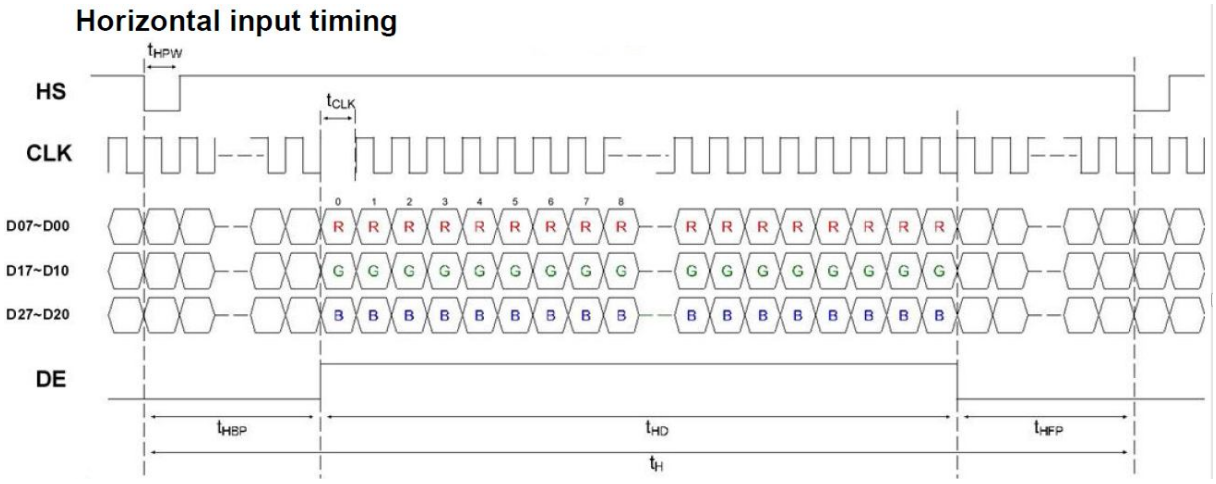
5.1 LVDS signal timing characteristics

VDD=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ	Max	Unit	Remark
CLK frequency	1/tclk	62.6	68.2	78.1	MHz	
Horizontal blanking time	tHBT	20	69	164	tclk	thbp + tHFP
Horizontal back porch	tHBP	-	5	164- tHFP	tclk	
Horizontal display area	tHD	-	1280	-	tclk	
Horizontal front porch	tHFP	15	64	159	tclk	
Horizontal period	tH	1300	1349	1444	tclk	
Horizontal pulse width	tHPW	-	1	256	tclk	
Vertical blanking time	tVBT	5	42	101	tH	tVBP + tVFP
Vertical back porch	tVBP	-	2	101- tVFP	tH	
Vertical display area	tVD	-	800	-	tH	
Vertical front porch	tVFP	3	40	99	tH	
Vertical period	tV	803	842	901	tH	
Vertical pulse width	tVPW	-	1	128	tH	
Frame Rate	F	-	60	-	HZ	

Table 5.1 timing parameter

5.2 Input Clock and Data timing Diagram:



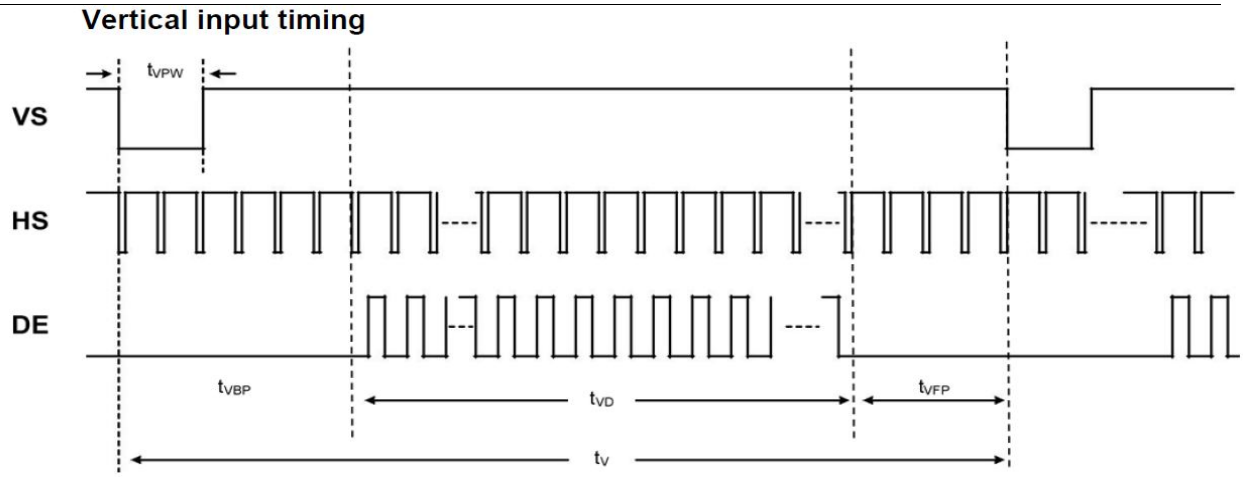
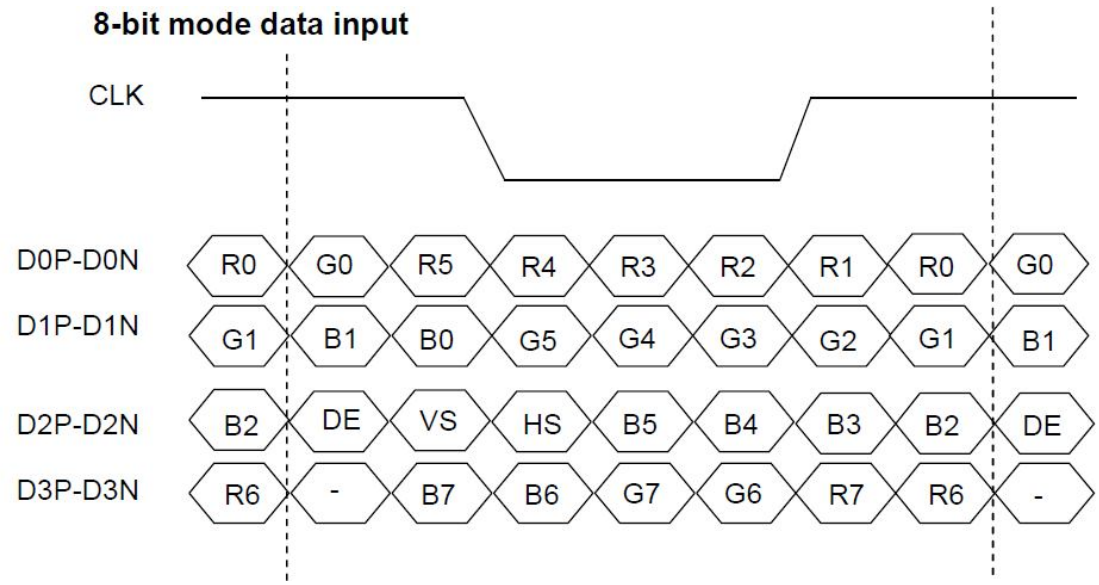
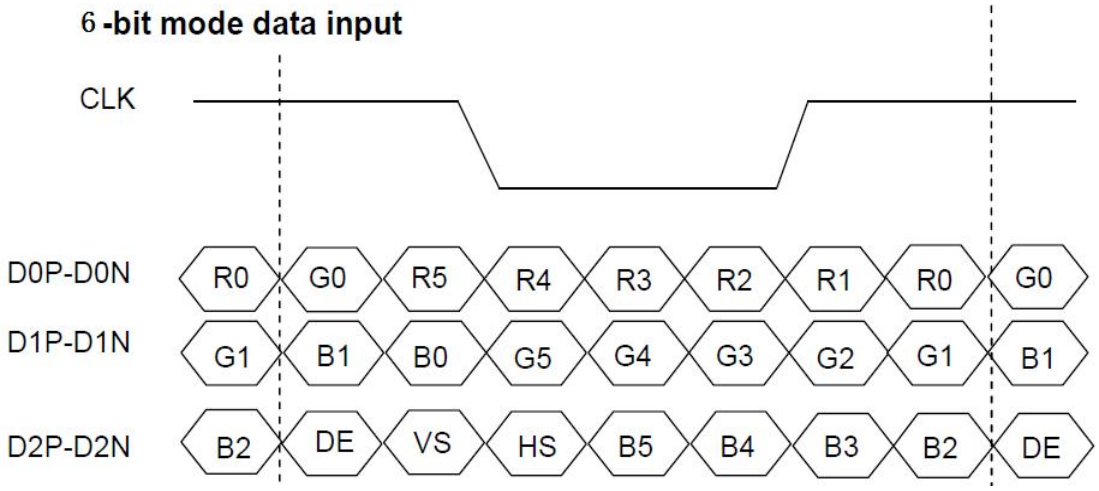


Figure 5.2 Input signal data timing

5.3 LVDS data input format





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 VELD 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 5.1 Power on/off sequence

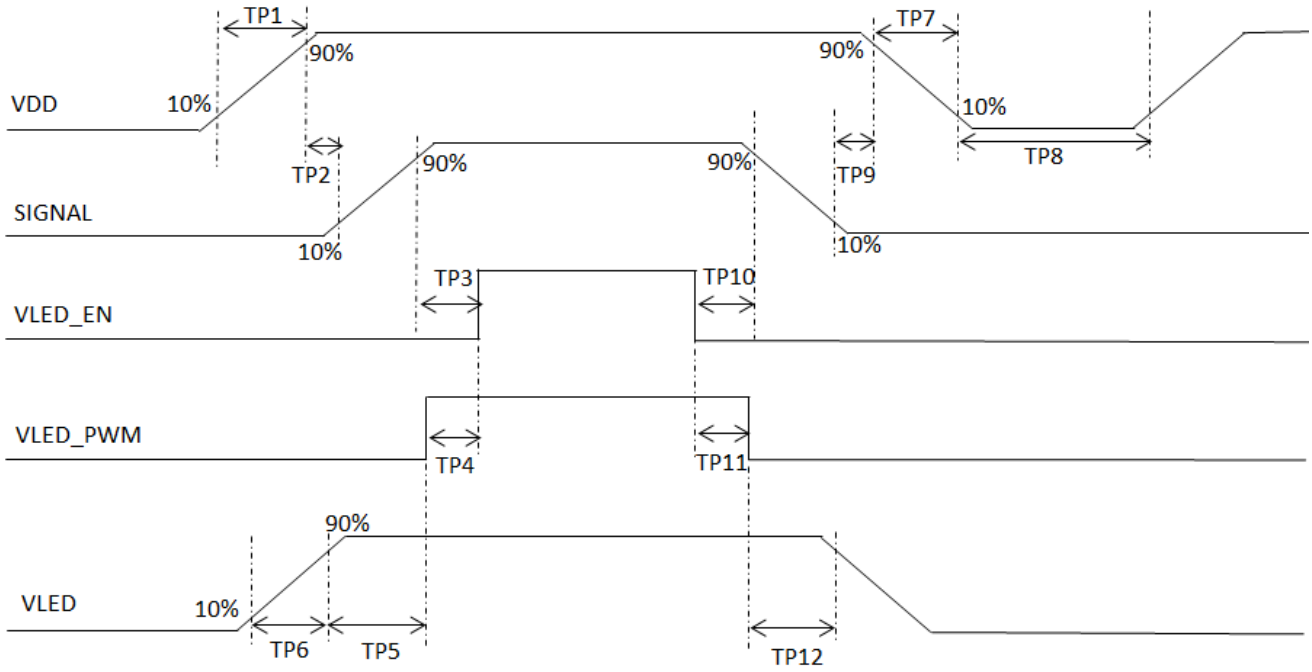


Figure 5.2 Interface power on/off sequence

6 Optical Characteristics

Ta=25℃

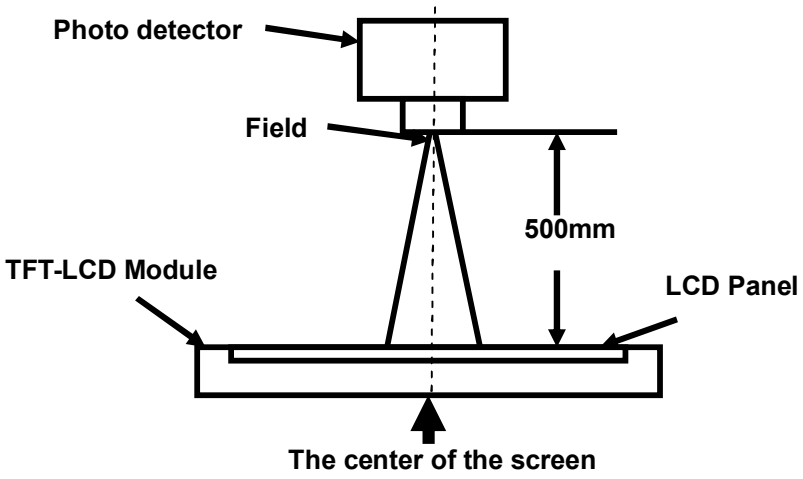
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≥10	75	85	-	Degree	Note 2
		θB		75	85	-		
		θL		75	85	-		
		θR		75	85	-		
Contrast Ratio		CR	θ=0°	500	700	-	-	Note1 Note3
Response Time		$T_{ON+}T_{OFF}$	25℃	-	25	40	ms	Note1 Note4
Chromaticity	White	x	Backlight is on	0.252	0.302	0.352	-	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		800	1000	-	cd/m^2	Note1 Note7

Test Conditions:

1. The ambient temperature is 25±2℃. humidity is 65±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。

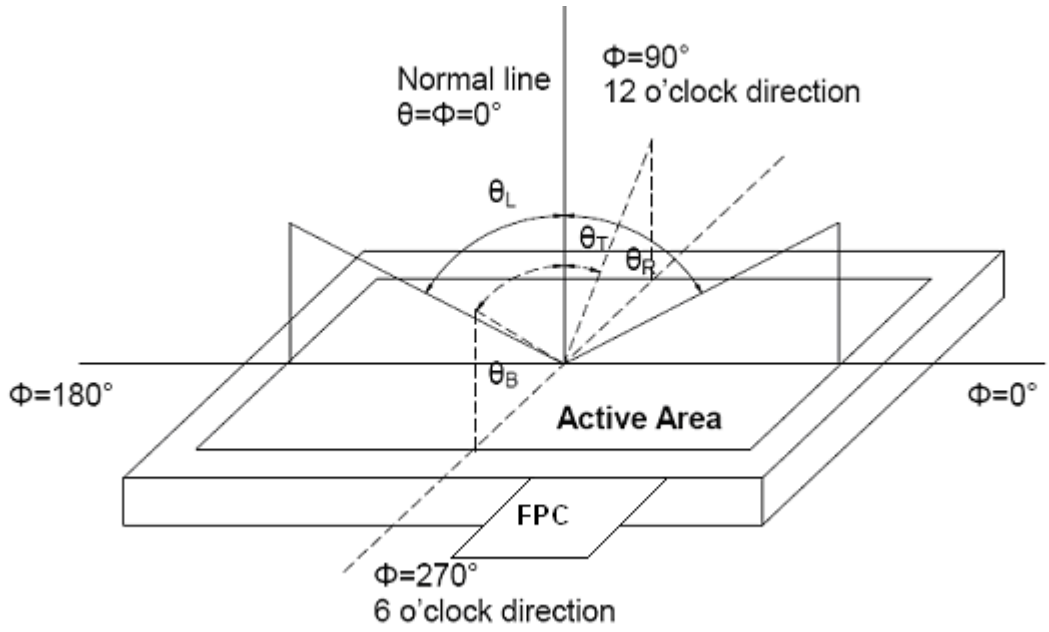


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

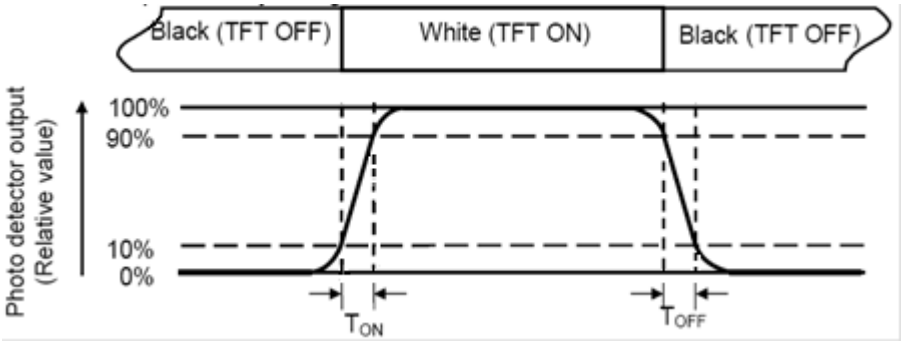
“White state “:The state is that the LCD should driven by Vwhite.

“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 10% to 90%. And fall time (TOFF) is the time between photo detector output intensity changed from 90% to 10%.



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) = Lmin/ Lmax

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

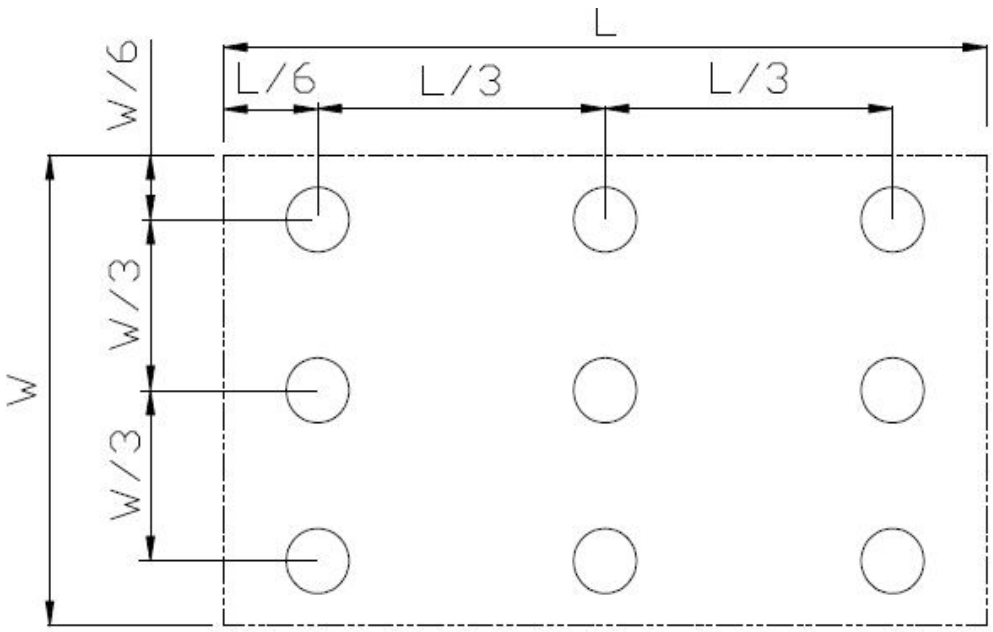


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: 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℃, 240hrs	(Note1) IEC60068-2-1:2007,GB2423.2-2008
2	Low Temperature Operation	Ta=-20℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage (non-operation)	Ta=+80℃, 240hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage (non-operation)	Ta=-30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & High Humidity Operation	Ta = +60℃, 90% RH max,240 hours	(Note2) IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+80℃ 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; 5points/panel; Contact:±4Kv, 5times/point; Air:±8KV,5times/point;	IEC61000-4-2:2001 GB/T17626.2-2006
8	Package Vibration (non-operation)	2Hz~12Hz~100Hz~300Hz,0.0002g2/Hz~0.01g2/Hz~0.01g2/Hz~0.00001g2/Hz ， 30min for each direction of X Y Z	IEC60068-2-6:1982 GB/T2423.10—1995
9	Shock (non-operation)	60G 6ms, ±X,±Y,±Z 3 times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80 cm,1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

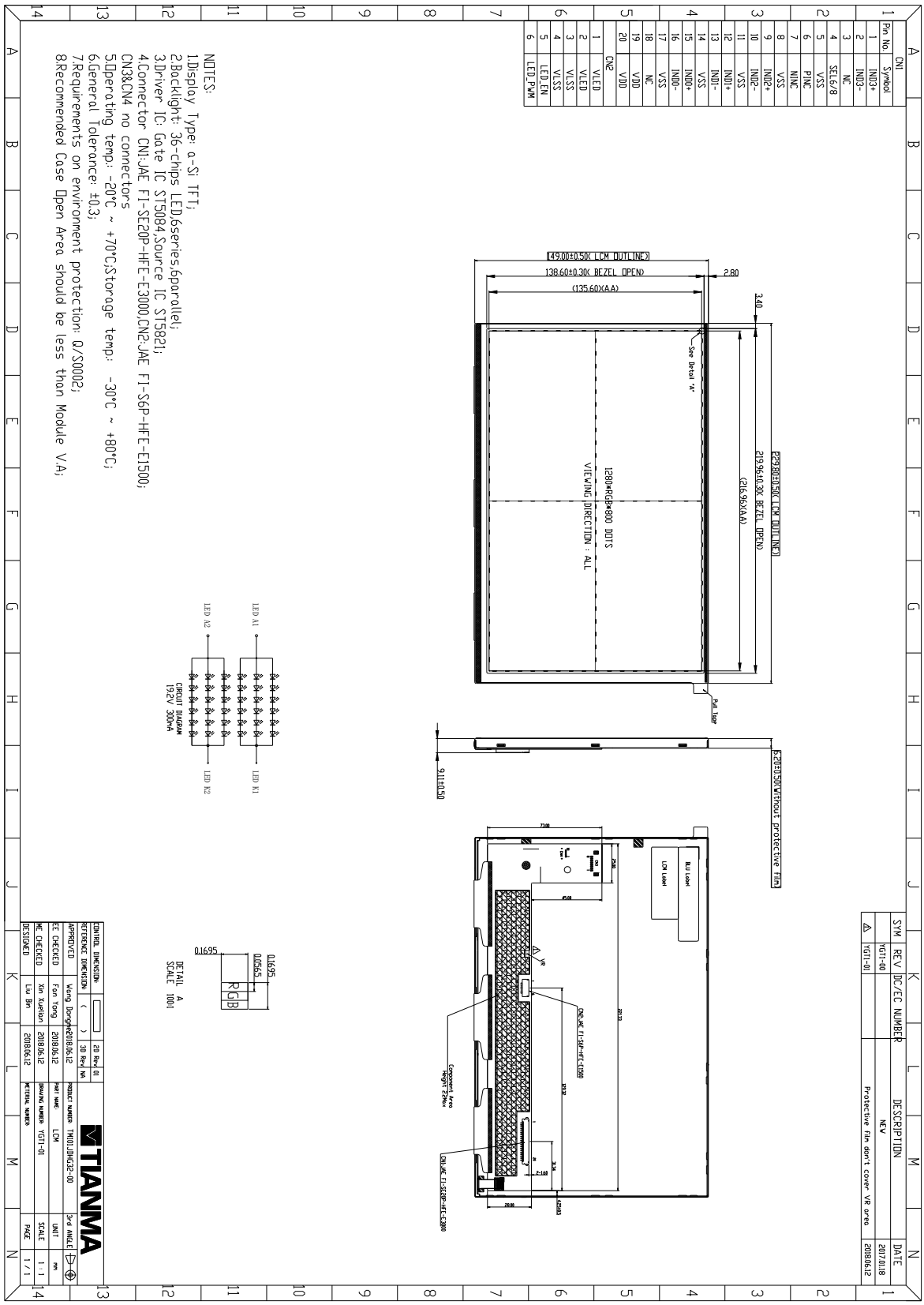
Note1: Ts is the temperature of panel's surface.

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

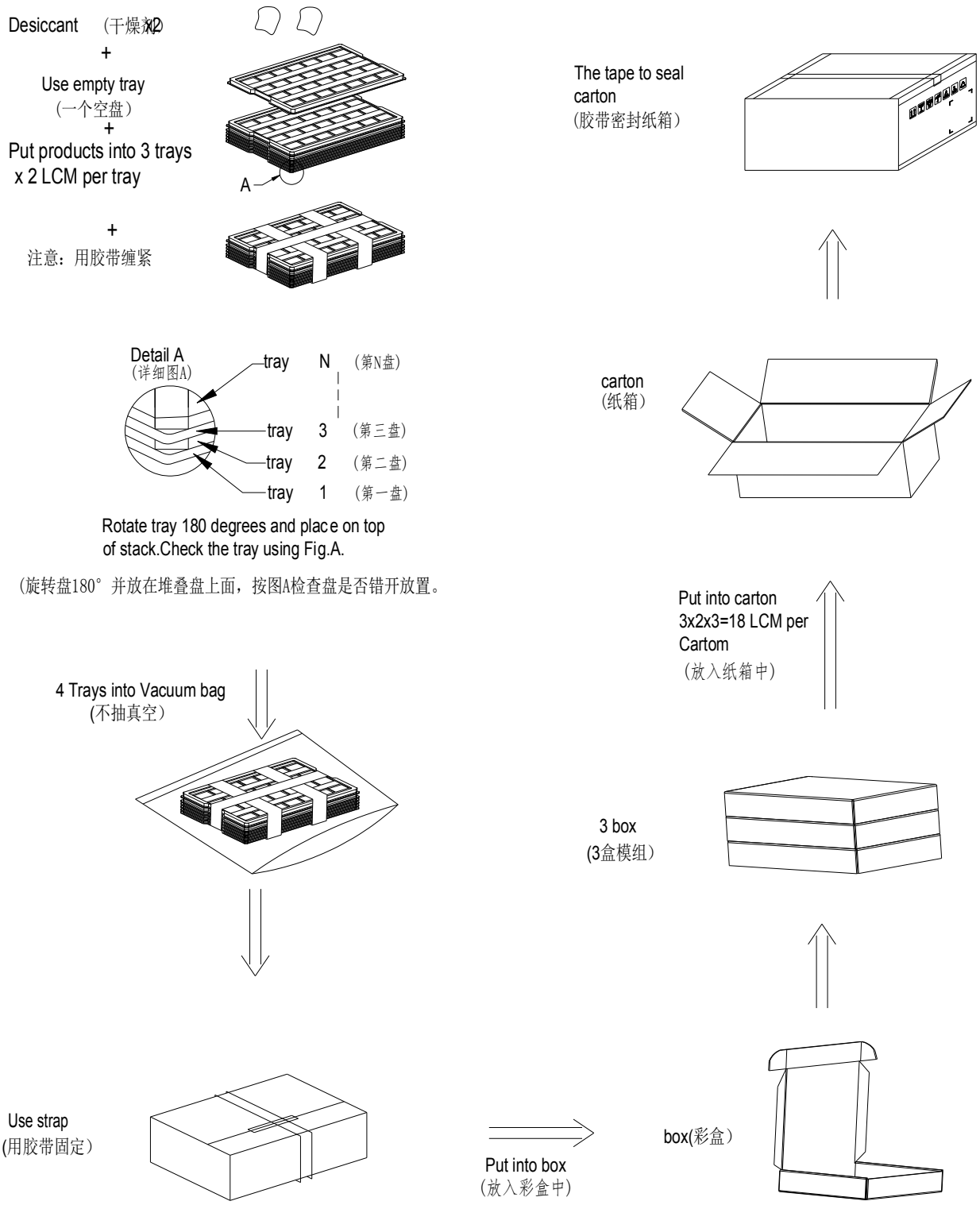


9 Packing Drawing

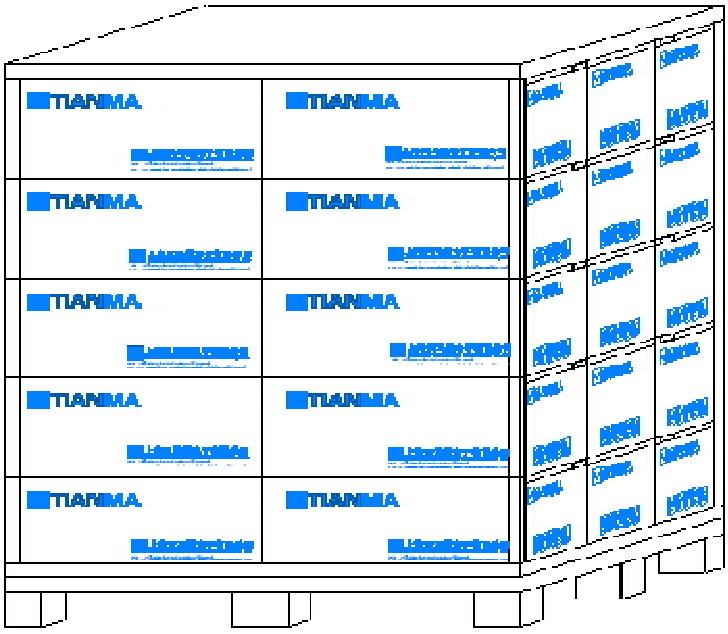
No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101JDHG32-00	229.8X149.0X9.11	0.2885	18	
2	Tray	PET(Transmit)	485X330X22.2	0.2523	12	Anti-static
3	Vacuum Bag	PE	600×500×0.08	0.05	3	
4	BOX	CORRUGATED PAPER	520×345×74	0.3879	3	
5	Desiccant	Desiccant	45×35	0.002	6	
6	Carton	CORRUGATED PAPER	544×365×250	1.01	1	
7	Label	Paper	100×52	0.0001	1	
8	Pearl cotton	TM101JDHG32-00 YPF1-00	293.3×228.2×1	0.0012	9	
9	Pearl cotton	TM101JDHG32-00 YPF2-00	379.9×228.2×1	0.0017	9	
10	Total weight	10.58±5% Kg				

The packing method is shown as below:

9.1 Dummy packing assembling
The packing method is shown as below:



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 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

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

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