Datasheet

Tianma

TM101JVHG32-00

TI-60-003

MODEL NO   :   TM101JVHG32

MODEL VERSION: 00

SPEC VERSION :   V1.2

ISSUED DATE: 2016-09-22

■Preliminary Specification
□Final Product Specification

Customer :_____

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Liu Bin Fan Yong Chen Paijie	Zhou Sen Zhuang Zhenliang Wan Cheng	Tan Feng

This technical specification is subjected to change without notice

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2016-06-02	Preliminary Specification Released.	Hongtao Chang
1.1	20/ 07/ 2016	1. General specifications : a. Pixel Pitch (mm) changed from 0.1695x0.1695 to 0.178x0.178. b. LCM (W x H x D) (mm) changed from 258.66x177.30x10.30 to 258.66x177.30x12.45 c. CN2 changed from CN2:JAE F1-S6P-HE-T-E1500 to CN2:JAE FI-S6P-HFE-E1500 2. Driving backlight(4.2): Min value of Back light supply voltage changed from 5.5 to 11.5 3.Optical Specification(6.1) : define value of viewing angle& chromaticity, value of luminance changed(Min(400->700);Typ(500->850) 4.Packing Drawing a. LCM moduel Dimension changed from 231.22x150.60x4.30 to 258.66x177.3x12.45 b. LCM module Quantity changed from 24 to 18 (related 9.1 Dummy packing assembling changed)	Mingxu Xiao
1.2	22/09/2016	1. General specifications: Pixel Pitch (mm) changed from 0.178x0.178 to 0.1695x0.1695 2. Add CTP character 3. Update mechanical drawing and packing drawing	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：229.80x149.0
		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	Φ7mm
	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
Electrical Characteristics	Interface	TFT: LVDS, 6/8bit selectable
		CTP:USB
	Color Depth	262K/16.7M
	Driver IC	TFT:ST5084*1,ST5821*3
		CTP:SSD2533QN10

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

3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Voltage Input	Vin	-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/m³	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.

3.2 CTP absolute Maximum Ratings

Item	Symbol	Min.	Max	Unit	Remark
Input Voltage	VCI	-0.3	5.5	V	
Current Drain Per Pin Excluding VCI and AVSS	I	--	25	mA	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

Table 3.2   CTP absolute Maximum Ratings

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

VCC=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		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	

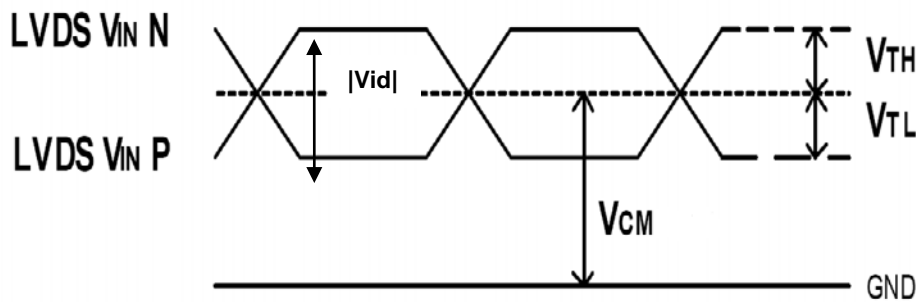**Table 4.1 LCD module electrical characteristics**

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
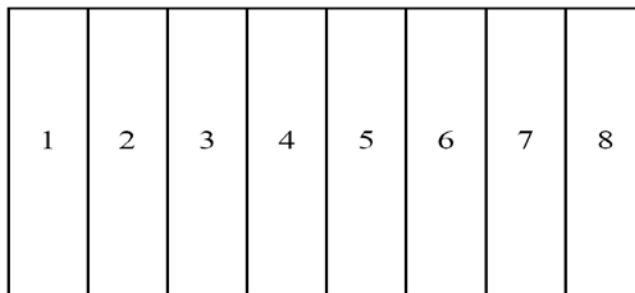4. Green
5. Magenta
6. Red
7. Blue
8. Black

Figure 4.1.2 Current dissipation testing pattern

4.2   CTP recommended Operating Condition

(T_A= 25℃,VDD1=5.0V)

Item	Min	Typ	Max	Unit	Note
power supply voltage	3.3	5.0	5.5	V	
IO voltage	3.3	5.0	5.5	V	1
Operating mode current	--	--	--	mA	2

Note1: If there are other voltage requirements, can be realized by changing the design, the adjustable range is 3.3V to 5.0V.

Note2: All current measurement is average current at Operating mode.

condition (Ta=25℃,VDD1=5V)

No.	Item	Specification	NOTE
1	Linearity	±1.5mm at the center，2.0mm at the border	Copper stickΦ7
2	Veracity	±1.5mm at the center，2.0mm at the border	Copper stickΦ7
3	Sensitivity	±1.5mm at the center，2.0mm at the border	Copper stickΦ7

4.3   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	-	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 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.

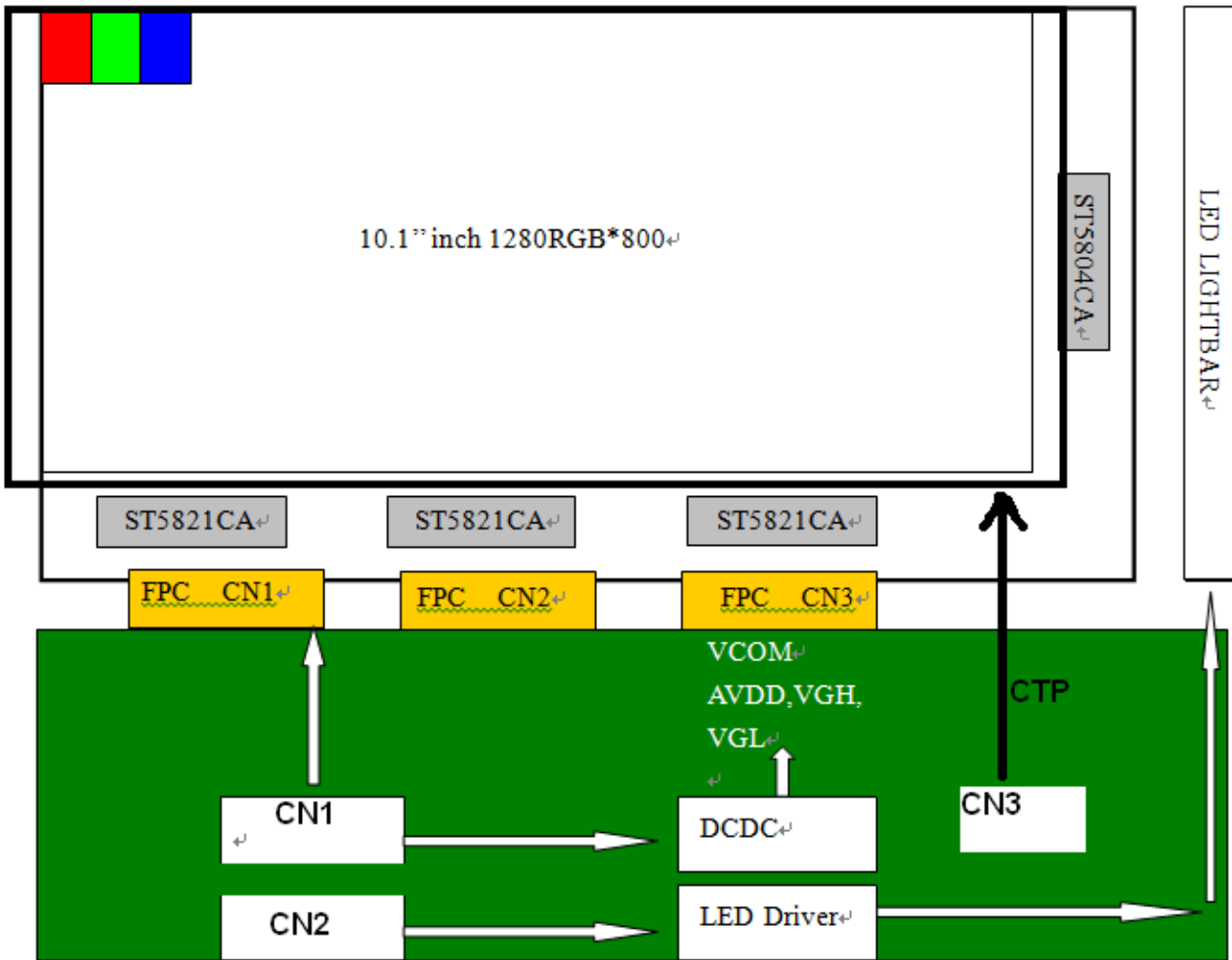If LED is driven by high current, high ambient temperature & humidity condition.The life time of LED will be reduced.

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

Typical operating life time is estimated data.

4.4 Block Diagram

10.1"inch 1280RGB*800

ST5804CA

LED LIGHTBAR

ST5821CA

ST5821CA

ST5821CA

FPC　CN1

FPC　CN2

FPC　CN3

VCOM
AVDD,VGH,
VGL

CTP

CN1

CN2

DCDC

LED Driver

CN3

5 Timing Chart

5.1 LVDS signal timing characteristics

VCC=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ	Max	Unit	Remark
CLK frequency	1/t_{clk}	62.6	68.2	78.1	MHz	
Horizontal blanking time	tHBT	20	69	164	t_{clk}	thbp + tHFP
Horizontal back porch	tHBP	-	5	164- tHFP	t_{clk}	
Horizontal display area	tHD	-	1280	-	t_{clk}	
Horizontal front porch	tHFP	15	64	159	t_{clk}	
Horizontal period	tH	1300	1349	1444	t_{clk}	
Horizontal pulse width	tHPW	-	1	256	t_{clk}	
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:

Vertical input timing
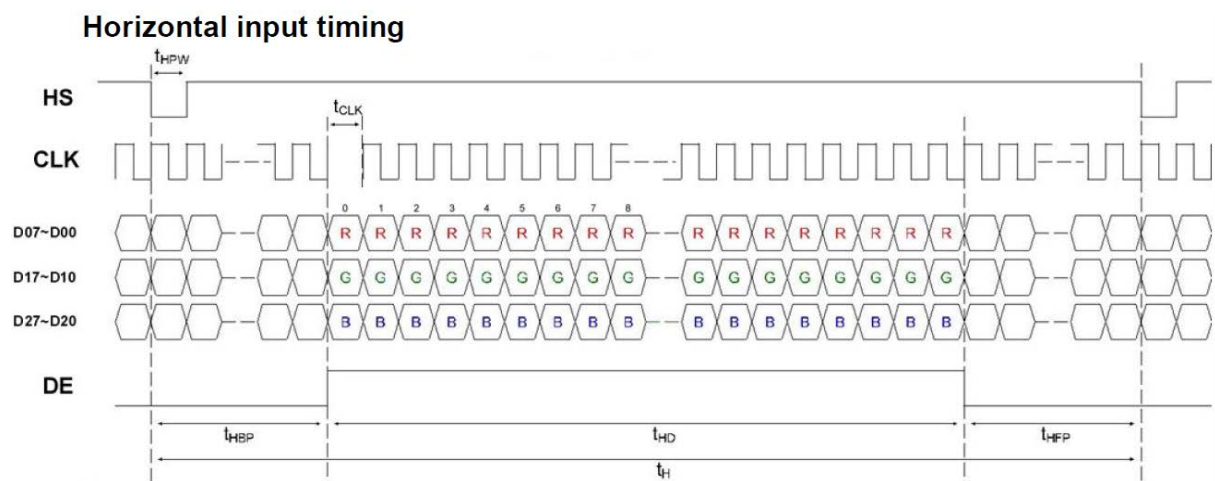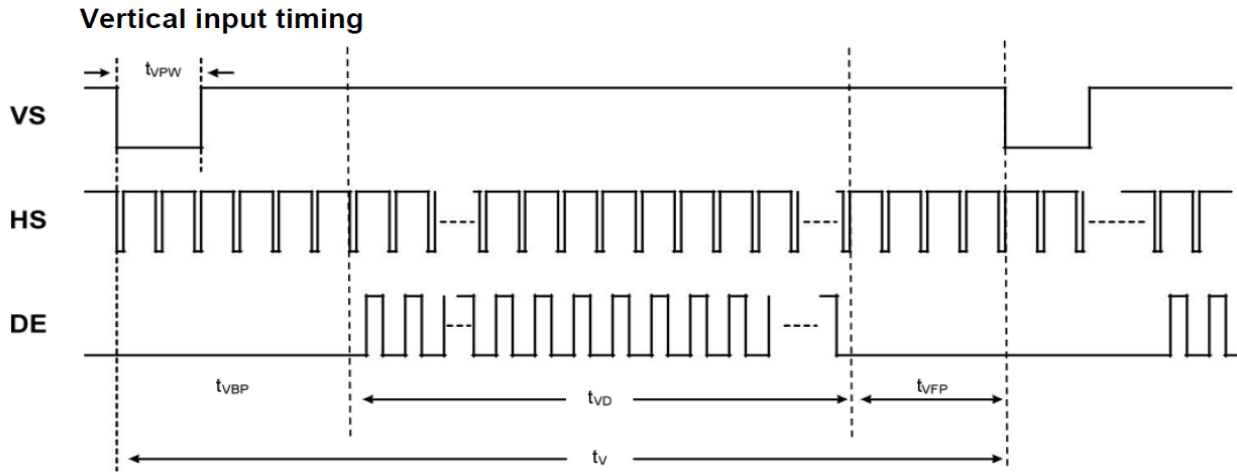
Figure 5.2 Input signal data timing

5.3 LVDS data input format
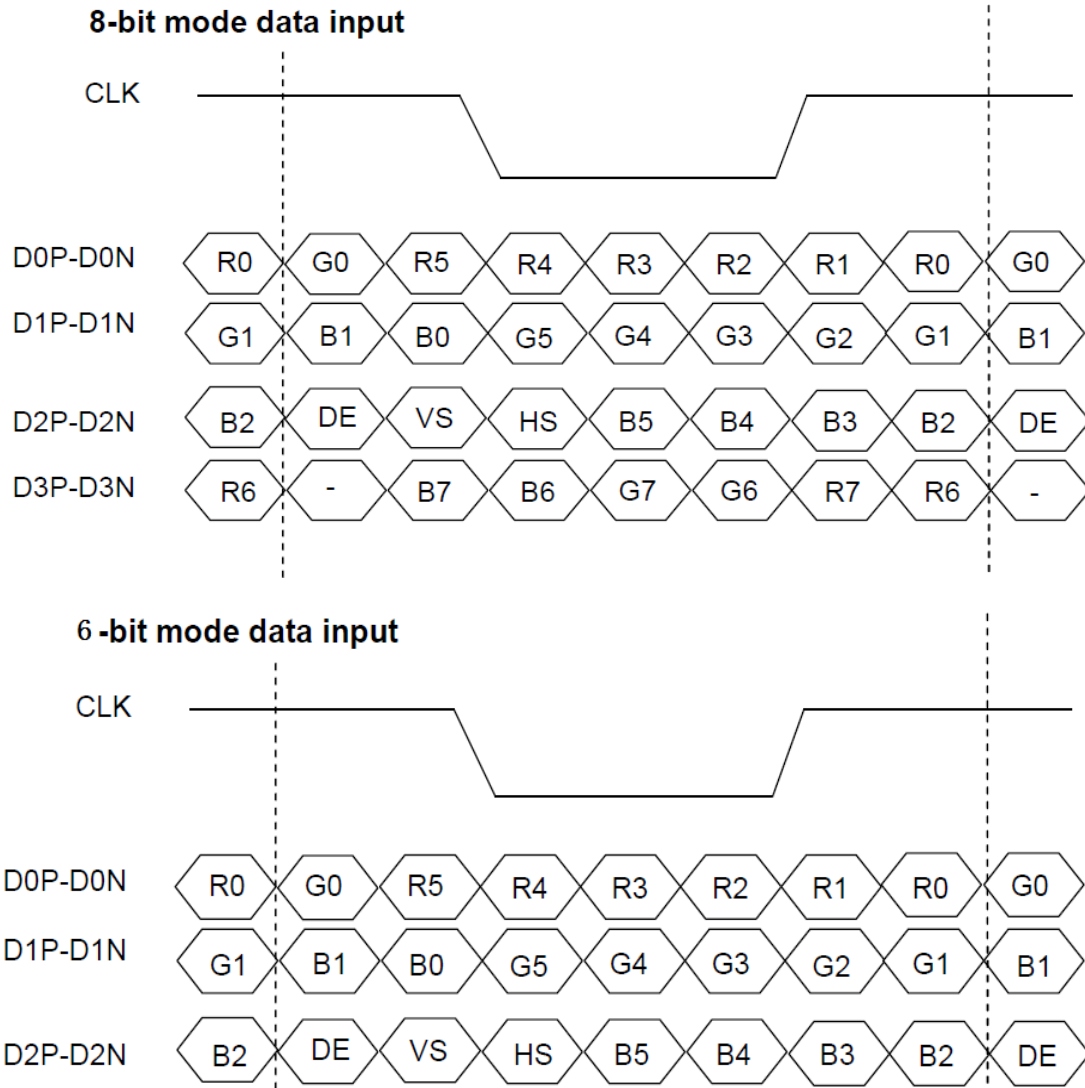
8-bit mode data input

6-bit mode data input

5.4 Power On/Off Sequence

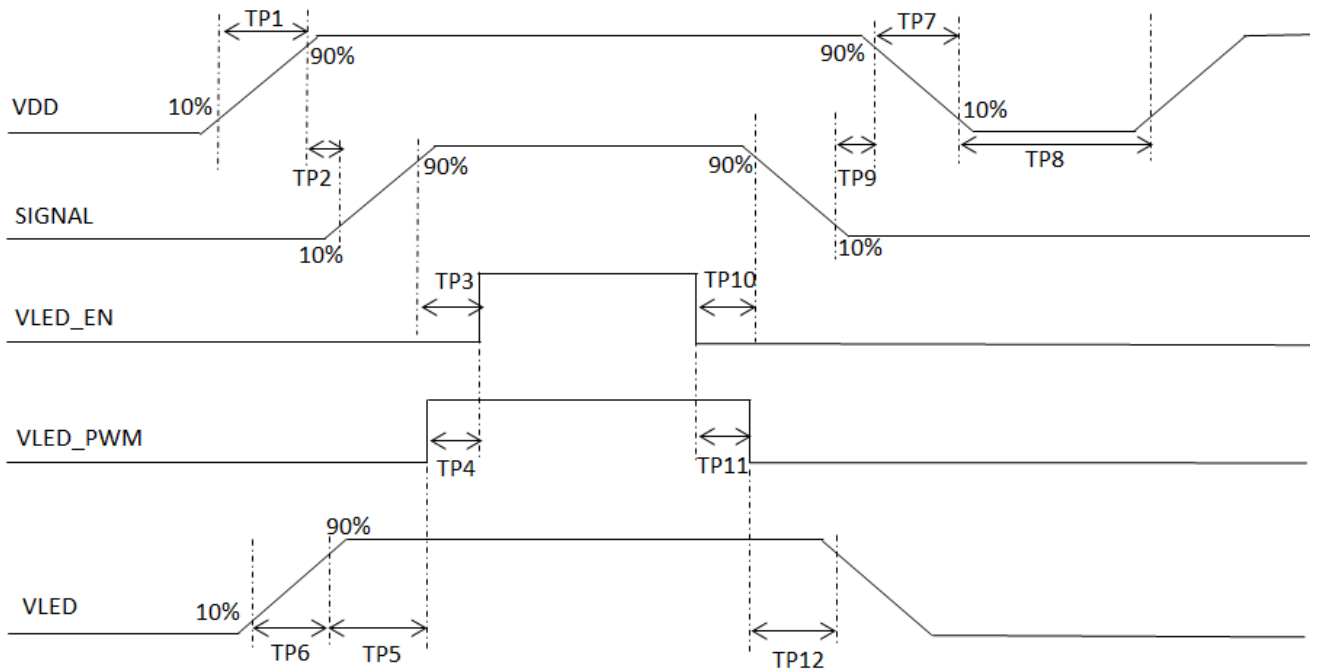| Item	Symbol	Min	Typ	Max	Unit	Remark
VDD on to VDD stable	Tp1	0.5	-	10	ms	
VDD stable to signal on	Tp2	0	-	50	ms	
Signal on to VLED_EN on	Tp3	200	-	-	ms	
PWM on to VLED_EN on	Tp4	0	-	200	ms	
VLED to PWM on	Tp5	10	-	-	ms	
VLED on to VELD stable	Tp6	0.5	-	10	ms	
VDD off time	Tp7	0	-	10	ms	
VDD off to 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

6.1 Optical Specification

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°	600	800	-	-	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		700	850	-	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.
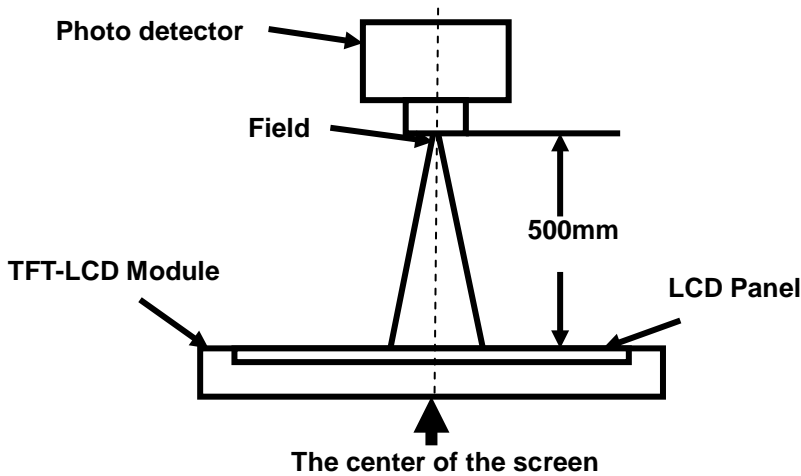
Note 2: Definition of viewing angle range and measurement system.

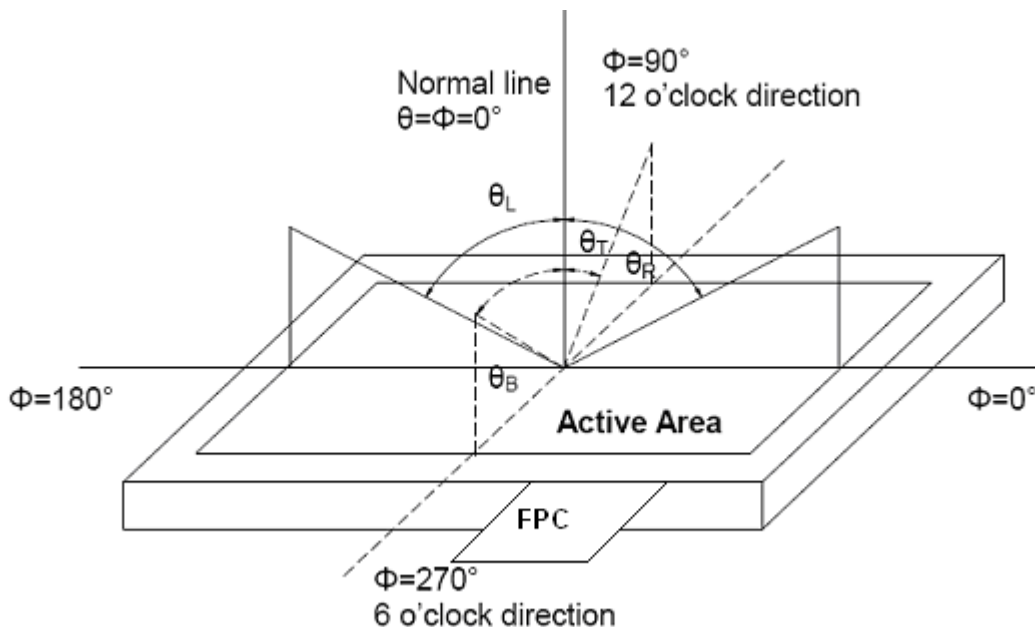viewing angle is measured at the center point of the LCD。

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 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.
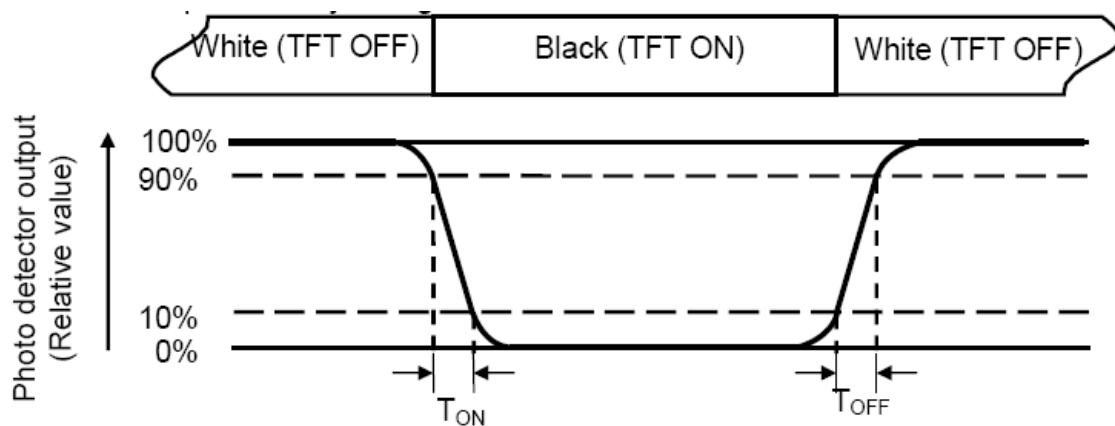
Note 5: Definition of color chromaticity (CIE1931)

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) = Lmin/ Lmax

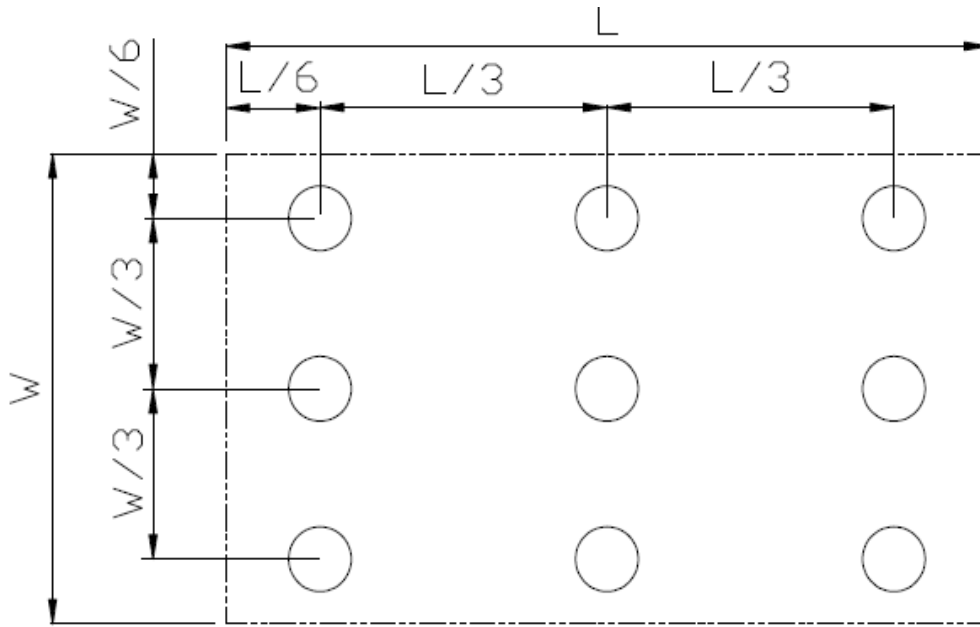L-------Active area length W----- Active area width

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; Contact:±4Kv, 5times; Air:±8KV,5times;	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (non-operation)	Frequency range:10～55Hz, Stroke:1.5mm Sweep:10Hz ～ 55Hz ～ 10Hz 2hours for each direction of X.Y.Z (6 hours total)	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:60 cm,1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

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

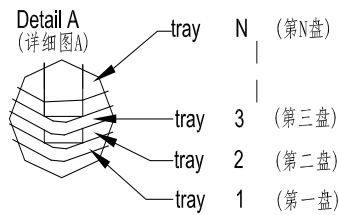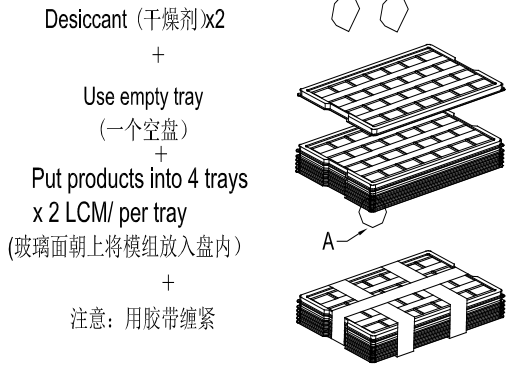Note2: Ta is the ambient temperature of sample.

8　Mechanical Drawing

NOTES:
1. Display Type: a-Si TFT;
2. Backlight: 36-chips LED,6series,6parallel,LED TYPE:EVERLIGHT CB414BF-BC;
3. Driver IC: Gate IC ST5084,Source IC ST5821,CTP Driver IC SSD2533QN10;
4. Connector CN1:JAE FI-SE20P-HFE-E3000,CN2:JAE FI-S6P-HFE-E1500,CN3:MOLEX 53261-0871;
5. Operating temp.: -20°C ~ +70°C;Storage temp.: -30°C ~ +80°C;
6. General Tolerance: ±0.3;
7. Requirements on environment protection: Q/S0002;
8. Recommended Case Open Area should be less than Module V.A;

VIEWING DIRECTION: ALL

1280(RGB)800 DOTS

CIRCUIT DIAGRAM
19.2V 360mA

DETAIL A
SCALE 100:1

9 Packing Drawing

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101JVHG32-00	258.66x177.3x12.45	0.4651	18	
2	Tray	PET(Transmit)	485×330×21mm	0.0224	12	
3	Anti-Static Bag	PE	600×500×0.08mm	0.05	3	
4	BOX	Corrugated Paper	520×345×74mm	0.3879	3	
5	Desiccant	Desiccant	45×35mm	0.002	6	
6	Label	Paper	100×52mm	0.0001	1	
7	Carton	Corrugated paper	544×365×250mm	1.01	1	
8	Total weight(Kg)	10.98kg±5%				

The packing method is shown as below:

9.1   Dummy packing assembling

Desiccant（干燥剂）x2
+
Use empty tray
（一个空盘）
+
Put products into 4 trays
x 2 LCM/ per tray
(玻璃面朝上将模组放入盘内）
+
注意：用胶带缠紧

A

The tape to seal
carton
（胶带密封纸箱）

Detail A
（详细图A)   tray   N   （第N盘）
                                    |
                                    |
                    tray   3   （第三盘）
                    tray   2   （第二盘）
                    tray   1   （第一盘）

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。
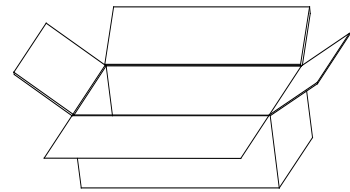
carton
（纸箱）

Put into carton
3x3x2=18 LCM per
Cartom
（放入纸箱中）

4 Trays into Vacuum bag
(不抽真空）

3 box
(3盒模组）

Use strap
(用胶带固定）
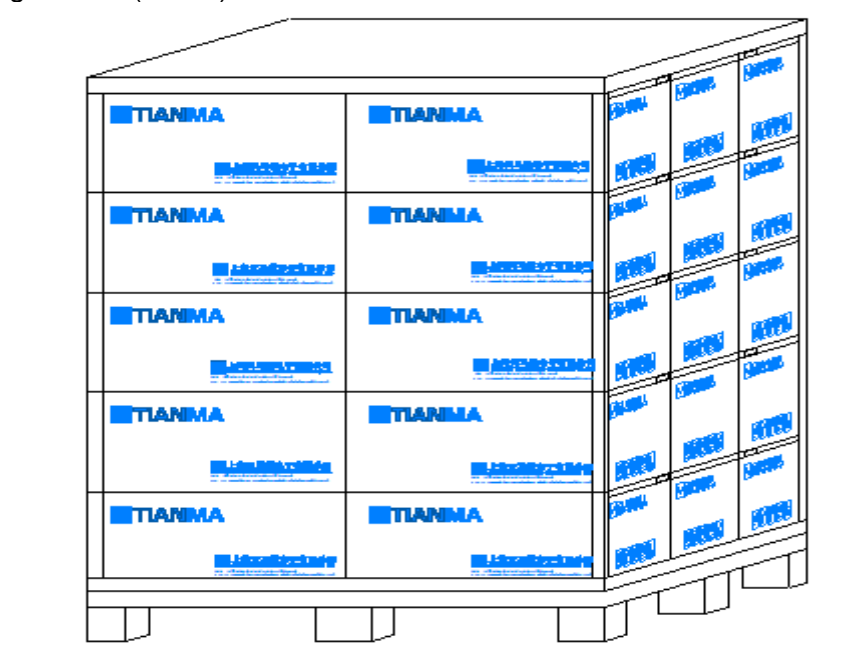
Put into box
（放入彩盒中）

box(彩盒)
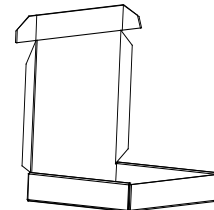
9.2 Stacking method(2x3x5)

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.

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

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