TIANMA

MODEL NO　　:　　　 <u>**TM101JVHP01**</u>

MODEL VERSION:　　　<u>**00**</u>

SPEC VERSION :　　　<u>**1.0**</u>

ISSUED DATE:　　　<u>**2016-04-27**</u>

■**Preliminary Specification**
□**Final Product Specification**

Customer : <u>　　　　　　　　　　　　　</u>

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Gang.li		Longping Deng

This technical specification is subjected to change without notice

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	206-04-27	Preliminary Specification Released.	Gang.li

1 General Specifications

Feature		Spec
Display Spec.	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
Mechanical Characteristics	LCM (W x H x D) (mm)	244.5x168.1x4.9
	Active Area(mm)	216.96 x 135.60
	Touch method	Projective Capacitive Touch
	Number of simultaneous touches	5 points
	Minimum Touch Area(mm)	$\phi 6$
	CTP Structure	G+G，Air gap
	Surface hardness	6H
	Matching Connection Type	LCD: F62240-H1210A CTP: FH34SRJ-6S-0.5SH
	LED Numbers	33 LED
	Weight (g)	TBD
Electrical Characteristics	Interface	LVDS 8-bit
	Color Depth	16.7M
	Capacitive TP interface	IIC
	Capacitive TP IIC address	0x48
	Driver IC	LCD:ST5821CA*3 + ST5084CA*1
		CTP:SSD2543

Note 1: Requirements on Environmental Protection: Q/S0002

Note 2: LCM weight tolerance: ± 5%

2 Input/Output Terminals

2.1 LCD pin definition

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	Or LED_PWM
28	NC		No Connect	

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	Or CABC_EN
38	VGH		Gate ON Voltage	
39	LED+		LED Anode	
40	LED+		LED Anode	

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

Note2: CABC_EN should be set as follow

Pin	Enable	Disable
CABC_EN	High voltage	Low voltage or open

2.2 Capacitive TP pin definition

Recommended connector: FH34SRJ-6S-0.5SH

No	Symbol	I/O	Description	Remark
1	SCL	I	IIC clock	
2	SDA	I	IIC data	
3	INT	I	Interrupt pin	
4	GND	P	Ground	
5	Vcc	P	Power Supply +3.3V	
6	RESET	I	Reset pin	

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	℃	
Storage Temperature	Tst	-20	60	℃	
Relative Humidity Note2	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃＜Ta≤50℃
		--	≤55	%	50℃＜Ta≤60℃

Table 3   Absolute Maximum Ratings

Note1: Input voltage include Rxin0-/ Rxin0+、Rxin1-/ Rxin1+、Rxin2-/ Rxin2+、Rxin3-/ Rxin3+、
        RxCLK-/ RxCLK+、INT、SDA、SCL、RESET
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	2.80	3.30	3.60	V	
Power For Analog Circuit		AVDD	--	11	--	V	
Gate On Voltage		VGH	--	23	--	V	
Gate Off Voltage		VGL	--	-7.0	--	V	
Common Voltage		Vcom	--	4.3	--		
Differential input voltage		|Vid|	200	-	600	mV	
Differential input threshold voltage	Low level	VTL	-100	-	-	mV	
	High level	VTH	-	-	100	mV	
Differential input common voltage		Vcm	-	1.2	-	V	

Table 4.1 LCD module electrical characteristics
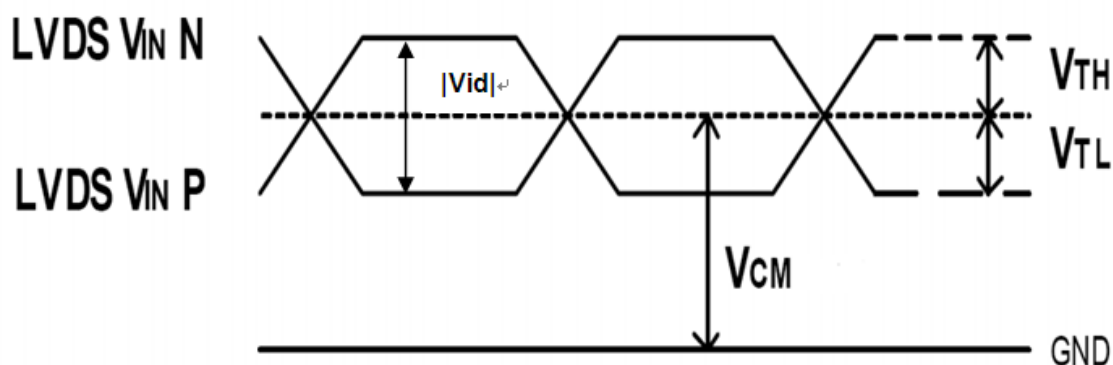
Figure4.1 LVDS DC characteristics

4.2 Capacitive TP DC characteristics

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply Voltage	VDD	-	3.30	-	V	
IO voltage	VIO	-	3.30	-		
Power supply current	ITP	-	TBD	-	mA	Operating mode

Table 4.2 Capacitive TP electrical characteristics

4.3 Driving Backlight

Ta=25 ℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	220	330	mA	
Forward Current Voltage	V_F	9.0	9.6	10.8	V	
LED lifetime	--	20000	30000	--	Hr	

Table 4.3 Backlight electrical characteristics

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.

CIRCUIT
DIAGRAM
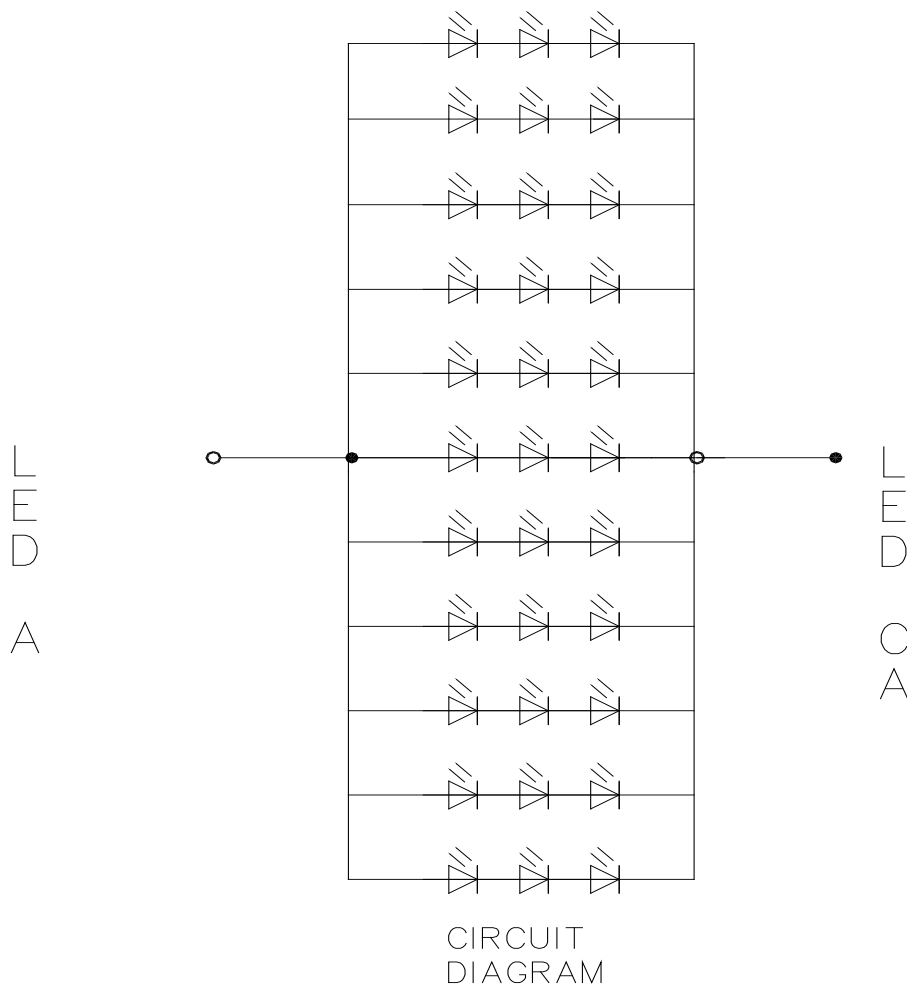
4.4 Power Supply Current

AGND=GND=0V, Ta = 25 ℃

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Power Supply Current	I_{DVDD}	VCC=3.3V	-	54.1	65	mA	
	I_{AVDD}	AVDD=11V	-	47.6	55	mA	
	I_{VGH}	VGH=23V	-	663	700	uA	
	I_{VGL}	VGL= -7V	-	663	700	uA	
	I_{VCOM}	VCOM=4.3V		2	3	uA	

NOTES: White picture, frame rate 60Hz.

5 Power ON/OFF sequence

5.1 Power sequence

$0.5ms < T_1 < 10ms$

VDD

$0 < T_2 < 50ms$

LVDS Signal — Normal signal

$T_3 > 0ms$

AVDD

VGL

$T_4 > 0ms$

VCOM

$T_5 > 120ms$

VGH

B/L
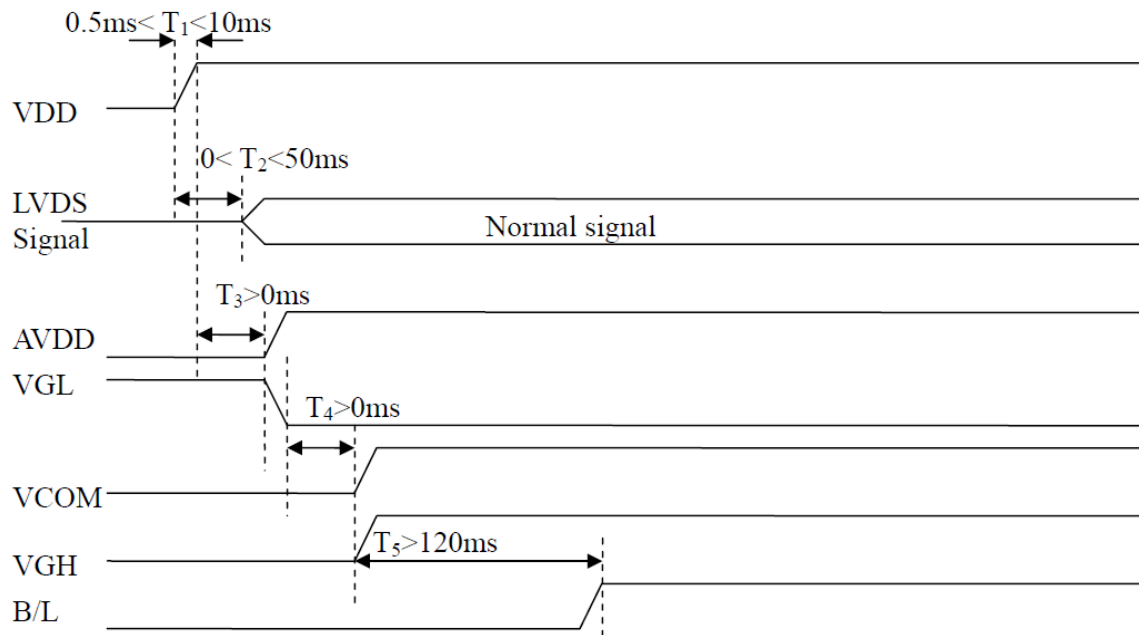
Figure5.1.1 Power on sequence

VDD

$0.5ms < T_1 < 10ms$

$0 < T_2 < 50ms$

LVDS Signal — Normal signal

AVDD

VCOM

>0ms

VGL

>0ms

VGH

>=0ms

B/L
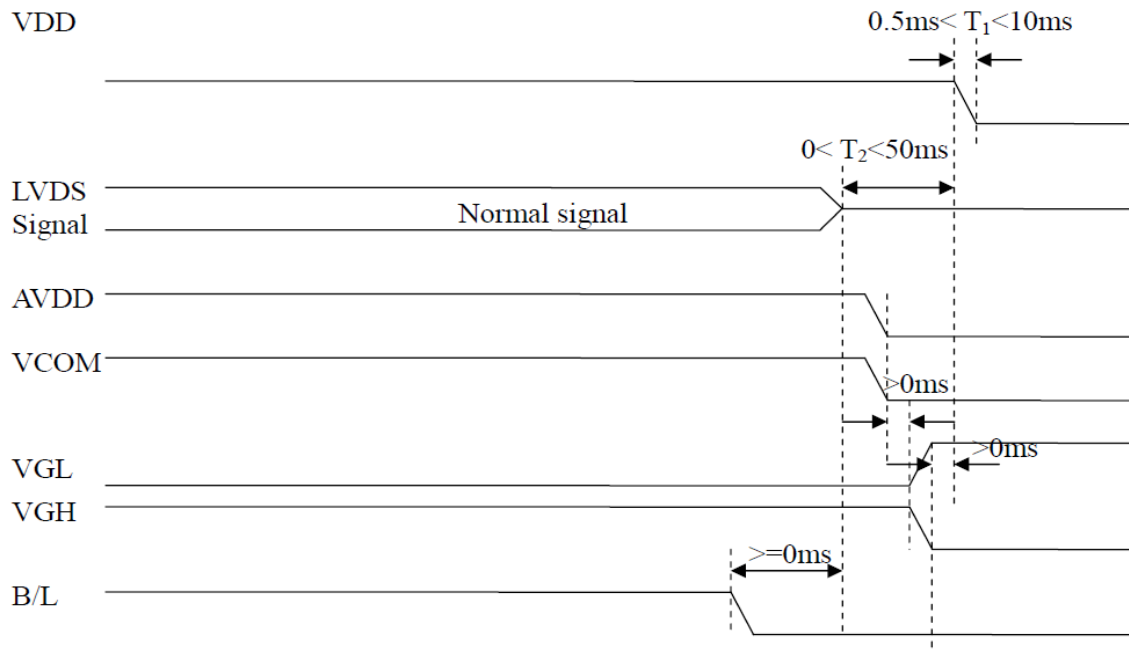
Figure5.1.2 Power off sequence

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

5.4 LVDS data input format

8-bit mode data input

CLK									
D0P-D0N	R0	G0	R5	R4	R3	R2	R1	R0	G0
D1P-D1N	G1	B1	B0	G5	G4	G3	G2	G1	B1
D2P-D2N	B2	DE	VS	HS	B5	B4	B3	B2	DE
D3P-D3N	R6	-	B7	B6	G7	G6	R7	R6	-

1.8V

VDD

tLVPLL

RXCLK

Internal Clock

6

LVDS_IN[3:0]

VTH
VTL

SW

tLVSKM | tLVSKM

Ideal Strobe Position

Note1: SW:Setup and hold time
Note2: tLVSKM=400ps at least.

6 Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR ≧	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_{ON}	25℃	-	25	50	ms	Note 4
		T_{OFF}						
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				-	50	-	%	Note 5
Luminance		L		300	350	-	cd/m^2	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.
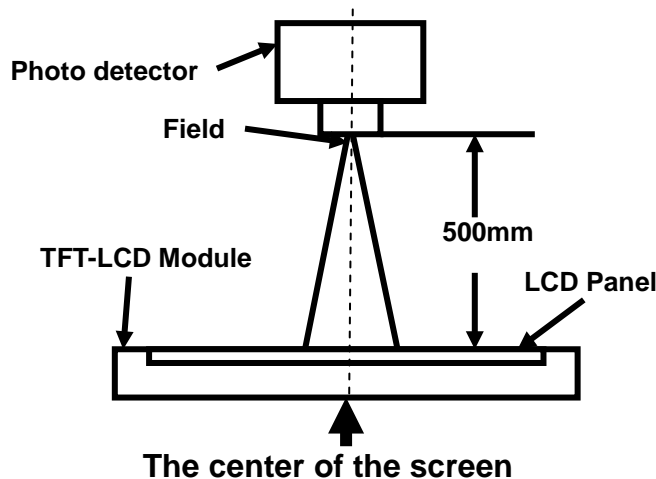
Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

The center of the screen

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)。
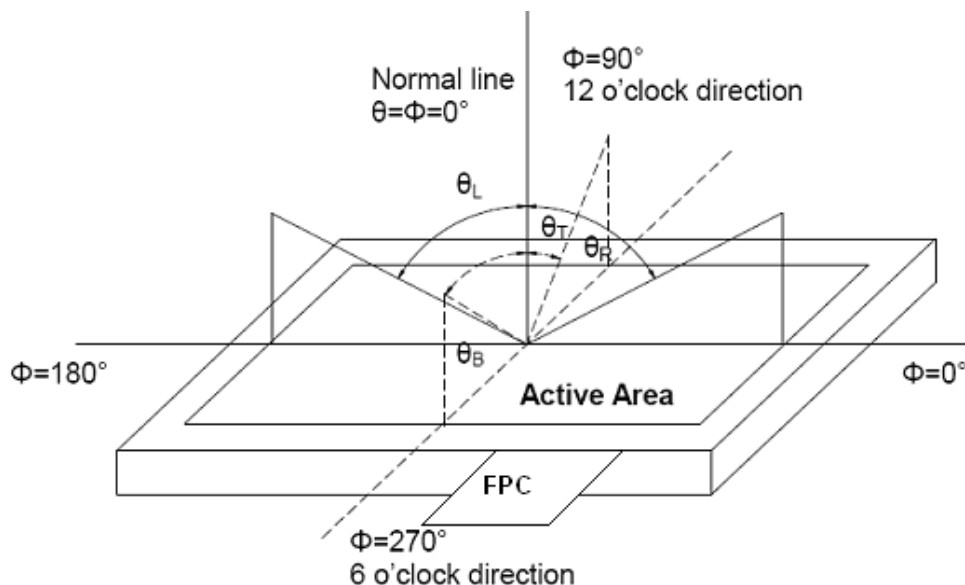
Note 3:   Definition of contrast ratio

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

"White state ": The state is that the LCD should drive by Vwhite.

"Black state": The state is that the LCD should drive 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 (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%.
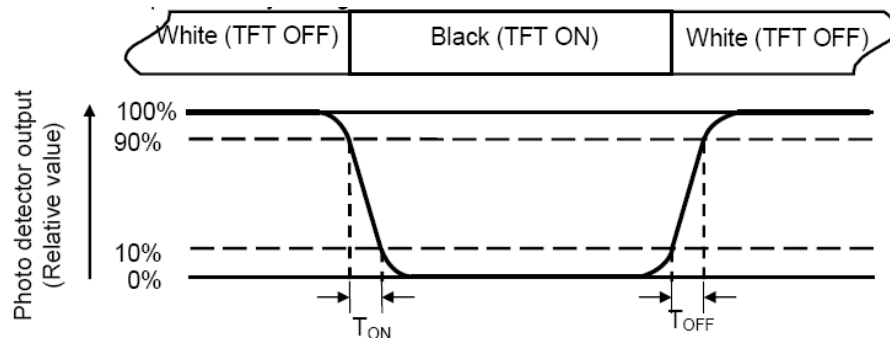
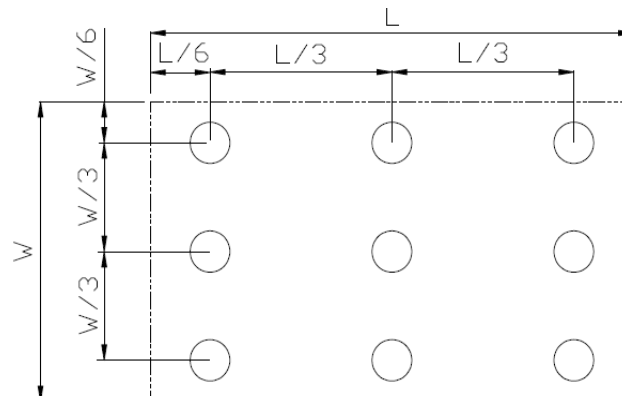
Note 5:   Definition of color chromaticity (CIE1931)

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.

Luminance Uniformity (U) = Lmin/ Lmax

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

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	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,GB2423.22-2002
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.

Note 5: Capacitive TP mechanical test

| No.	Item	Requirement	Remark
1	Impact test	No crack after test	φ9mm steel ball，30cm high dropped on glass surface(1 time)
2	Surface hardness test	6H	JIS-K5600

Note 6: Capacitive TP optical test

No.	Item	Min.	Typ.	Max.	Unit	Remark
1	Transmission	86	88	90	%	Note1,2

1: Measuring equipment: DMS-501, PR-705. @550nm
   Measuring condition:
   --After stabilizing and leaving the panel alone at a given temperature for 30 min, the
   measurement should be executed,
   --Measuring surroundings: a stable, windless and dark room,
   --Measuring temperature: Ta=25°C,
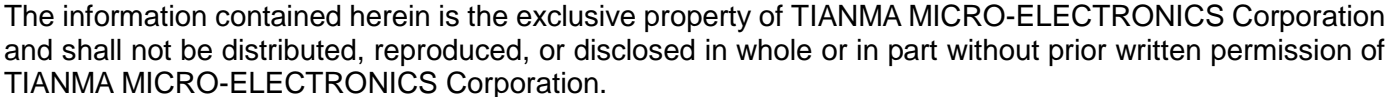   --30min after lighting the back-light.
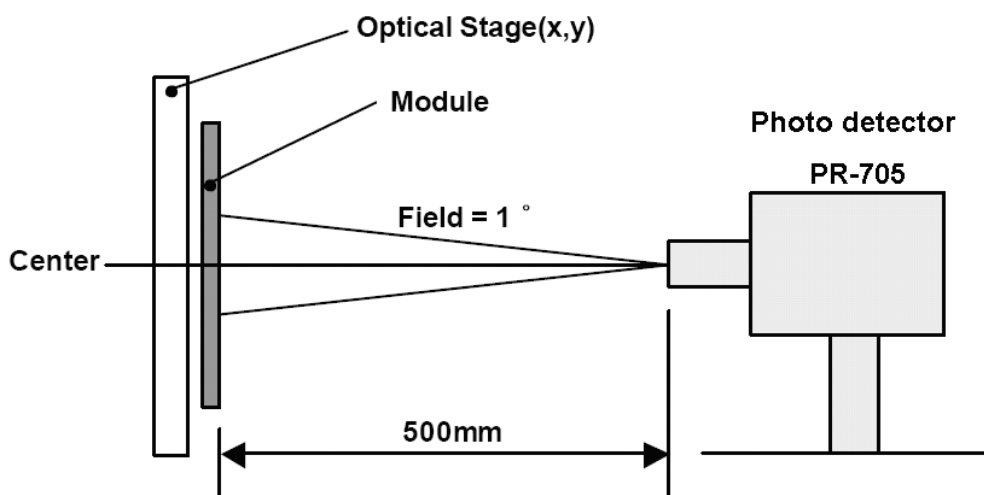
2: conform to National standard GB2410—80 /ASTM D1003—61(1997)
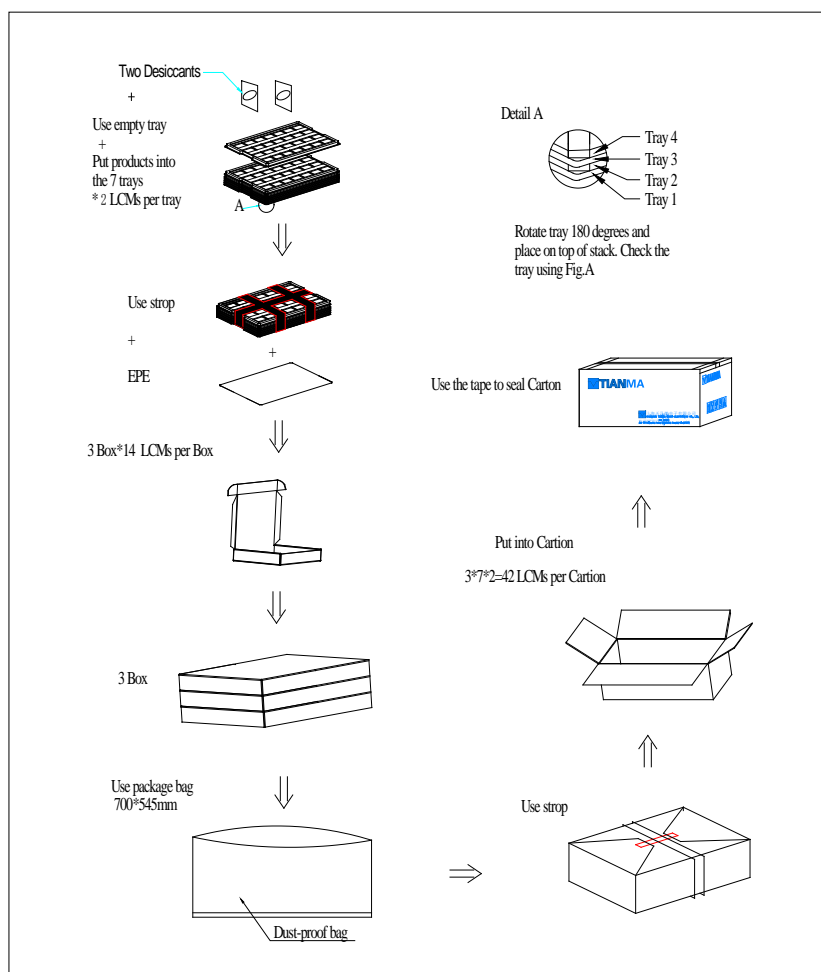
Note 7: Capacitive TP electeicall test

No.	Item	Specification	Remark
1	Function test	No open and no short for all X/Y sensors	Ta=25℃

8 Mechanical Drawing

9   Packing Drawing

No	Item	Model(Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101JVHP01	244.5X168.1X4.9			
2	Tray	PE	485×330×13.8	0.215		
3	Desiccant	-	45X35mm	0.002		
4	Dust-Proof Bag	PET	700*545*0.05	0.046		
5	Carton	Corrugated paper	544*365*250	1.01		
6	Label	paper	100*52	0.001		
7	Box	paper	520*345*74	0.3879		
6	Total weight	TBD				

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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.