MODEL NO : TM070JVHG33

MODEL VERSION: 00

SPEC VERSION : 1.0

ISSUED DATE: 2016-08-18

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

Customer :

Approved by	Note

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Jun Li		

This technical specification is subjected to change without notice.

Table of Contents

--Coversheet 1
1 General Specification 4
2. Input/output Terminals 5
3. Absolute Maximum Ratings 6
4 Electrical Characteristics 6
5. Timing Chart 9
6. Optical Characteristics 14
7. Reliability Test 17
8. Mechanical Drawing 19
9. Packing Drawing 20
10. Precautions for Use of LCD Modules 21

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2016-08-18	First release	Jun Li

1 General Specification

Item	Feature	Spec
Display Spec.	Size	7.0inch
	Resolution	1280(RGB) x 800
	Technology Type	a-Si
	Pixel Pitch(mm)	0.117(H)x 0.117(V)
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	SFT with Normally Black
	Surface Treatment(Up Polarizer)	HC
Mechanical Characteristics	LCM (W x H x D) (mm)	179.76 x123.6 x 6.35
	Active Area(W x H) (mm)	149.76 × 93.60
	LED Numbers	30 LEDs
	Matching Connection Type	CN1:F1-SE20P-HFE-E3000 CN2:F1-S6P-HFE-E1500 CN3: Molex 53261-0871
	Weight	TBD
	Operation temperature	-20~70℃
	Storage temperature	-30~80℃
Electrical Characteristics	Interface	LVDS USB option for CTP
	Color Depth	TBD
	Driver IC	3*ST5821C and 1*ST5084C
	CTP Driver IC	SSD2533QN10

Note 1: Requirements on Environmental Protection: Q/S0002

2. Input/output Terminals

2.1 TFT CN pin assignment

Connector type: **CN1:JAE F1-SE20P-HFE-E3000 CN2:JAE F1-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 supply for CTP	
2	D-	I	USB data- pin	
3	D+	I	USB data+ pin	
4	VSS1	P	Power Ground	
5	NC	-	No Connection	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	NC	-	No Connection	

Note1: I/O definition.
I---Input, O---Output, P--- Power/Ground, N--- No connection

3. Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V, Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VDD	-0.5	5.0	V	
	AVDD	-0.5	14.85	V	
	VGH	-0.3	20.0	V	
	VGL	-20.0	0.3	V	
Backlight Forward Current	I_{LED}	-	30	mA	For each LED
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

Table 3.1 absolute maximum rating

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

Ta = 25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Analog Supply Voltage	AVDD	8.0	10.4	13.5	V	
Gate On Voltage	VGH	15.7	16.0	16.3	V	
Gate Off Voltage	VGL	-7.1	-6.8	-6.5	V	
Common Electrode Driving Signal	VCOM	3.45	3.55	3.65	V	With the VR Knob

Table 4.1 LCD module electrical characteristics

Note1:For different LCM, the value may have a bit of difference.
Note2:To test the current dissipation, use “all Black Pattern” .

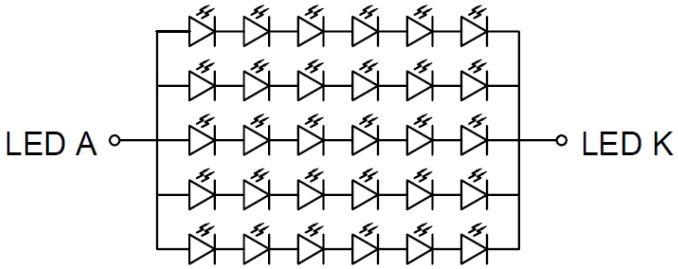
4.2 TFT Driving Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Forward Voltage	VLED	I_F=100mA	5.5	12	12.5	V	Note 1
Forward Current	I_F	-	-	100	-	mA	
Backlight Power Consumption	WBL	I_F=100mA	--	1830	TBD	mW	
Life Time	-	I_F=100mA	--	50,000	-	Hrs	Note 2

Table 4.2 LED backlight characteristics

Note 1: I_F is defined for one channel LED. There are total three LED channels in back light unit. Under LCM operating, the stable forward current should be inputted.

Note 2: 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.



LED CIRCUIT

(If=100mA / Vf=16.2-20.4V)

Figure 4.1 LED connection of backlight

4.3 TFT Block Diagram

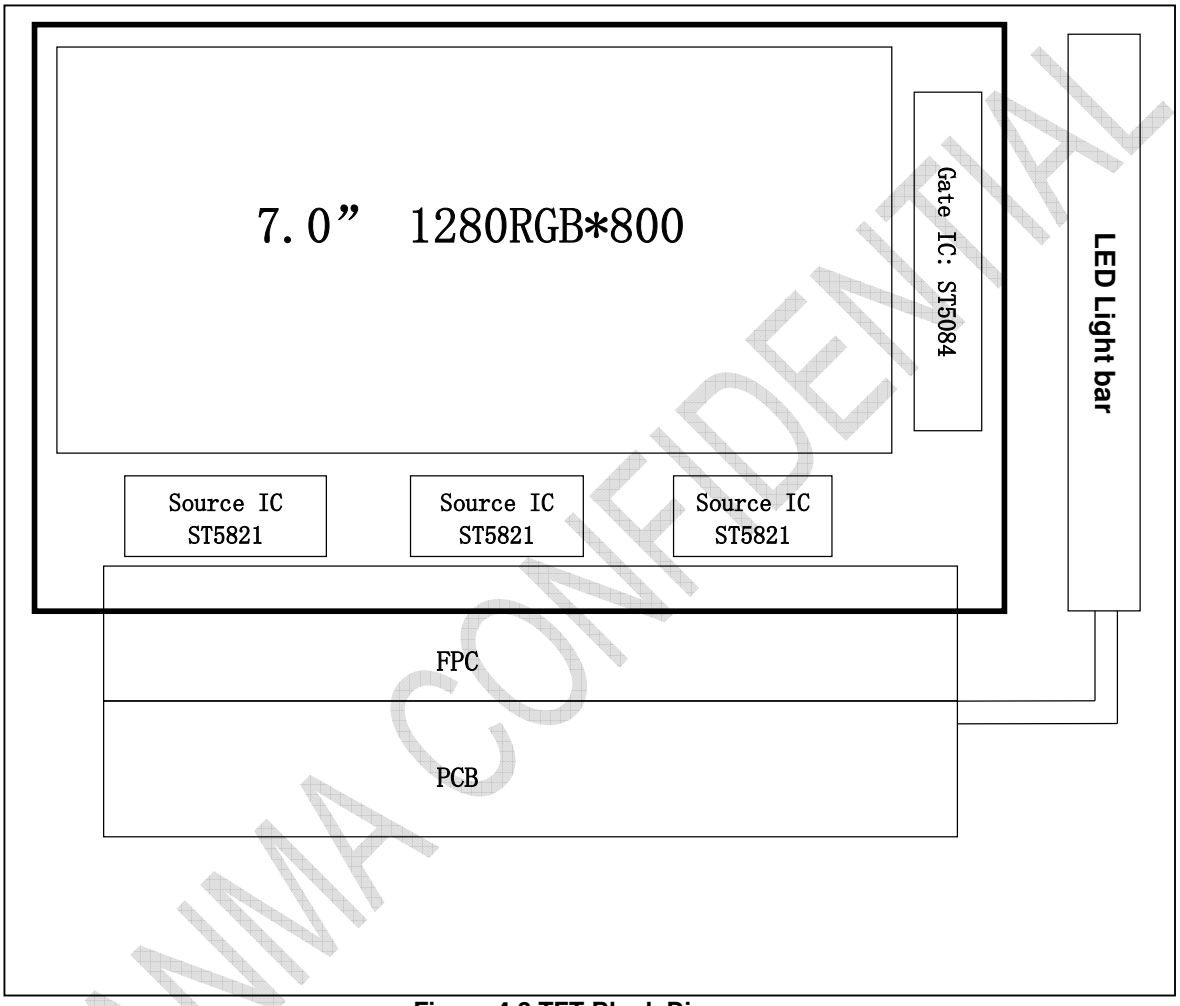
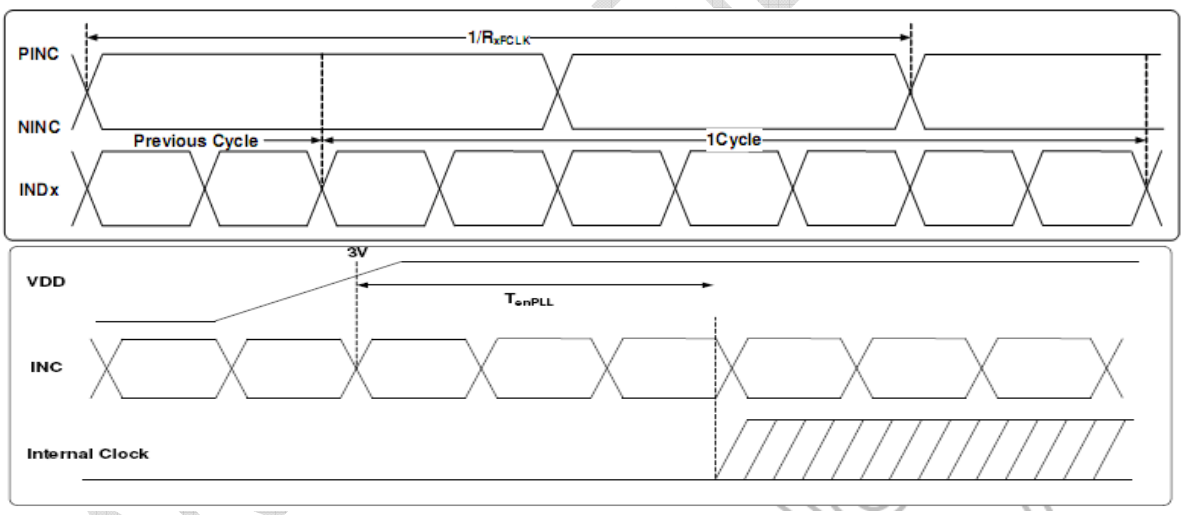


Figure 4.3 TFT Block Diagram

5. Timing Chart

5.1 AC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Clock Frequency	R_{xFCLK}	20	-	80	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	$\|V_{ID}\|$= 400mV, R_{xVCM}=1.2V R_{xFCLK}=80MHz
Clock high time	T_{LVCH}	-	4/(7 R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7 R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

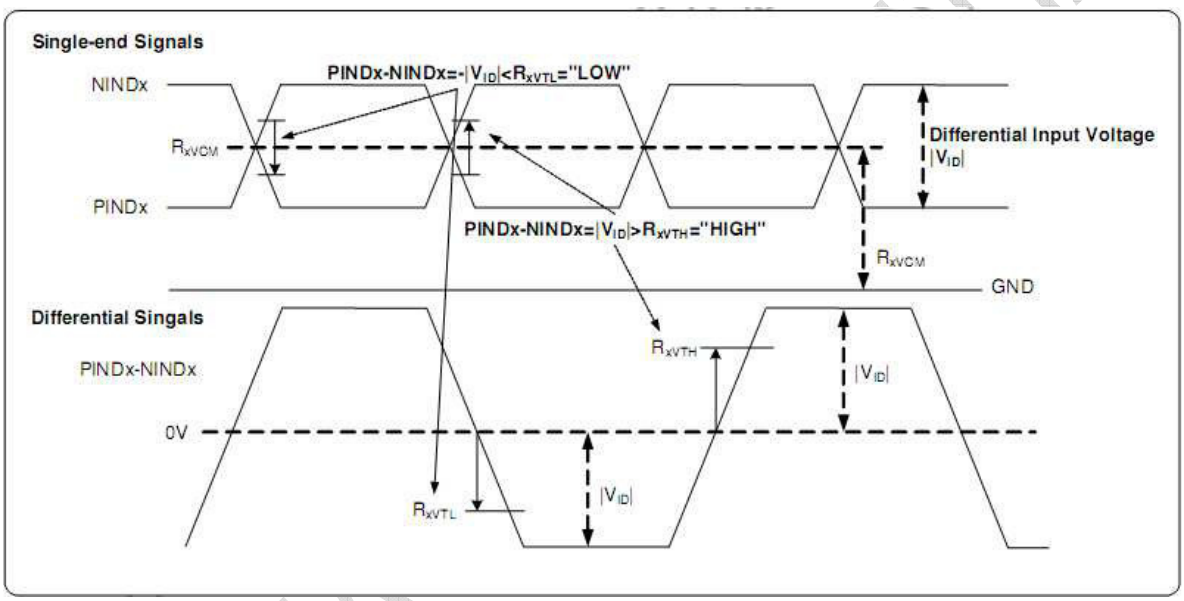


5.2 DC Electrical Characteristics

VDD=3.3V, AVDD=11V, AGND=GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Differential input high Threshold voltage	R_{XVTH}	–	–	+0.1	V	
Differential input Low Threshold voltage	R_{XVTL}	-0.1	–	–	V	
Input voltage range	R_{XVIN}	0	–	VDD-1.0	V	
Differential input common Mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	–	2.4-$\|V_{ID}\|/2$	V	
Differential input voltage	$\|V_{ID}\|$	0.2	--	0.6	V	

Differential input leakage Current	RV_{Xliz}	-10	--	+10	uA	
LVDS Digital Operating Current	Iddlvds	–	40	50	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	–	10	50	uA	Clock & all functions are stopped



5.3 Input timing

1280x800 (RES[3:0] = 0010)

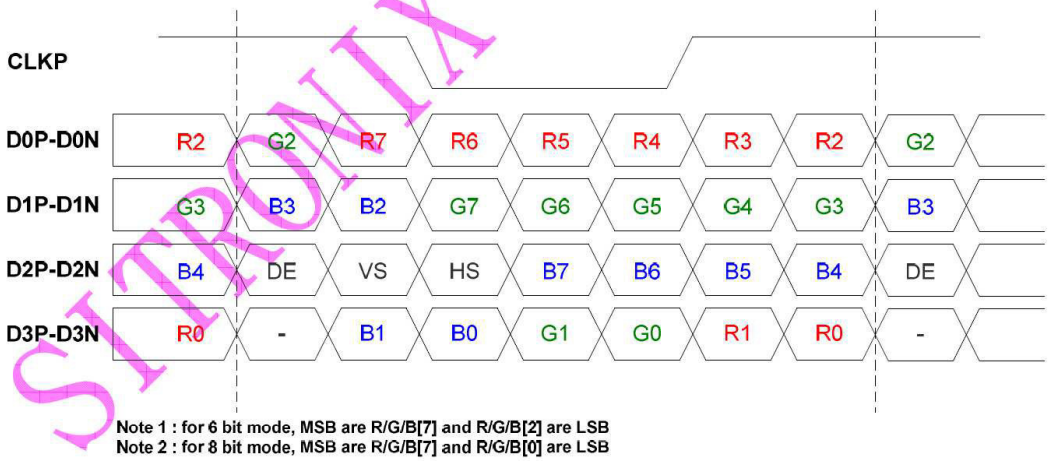
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	t_{CLK}	62.6	68.2	78.1	Mhz	
Horizontal blanking time	t_{HBT}	20	69	164	t_{CLK}	$t_{HBP} + t_{HFP}$
Horizontal back porch	t_{HBP}	5	5	164- t_{HFP}	t_{CLK}	
Horizontal display area	t_{HD}	1280	1280	1280	t_{CLK}	
Horizontal front porch	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 back 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	

5.4 Data Input Format

VESA data mapping

Note 1 : for 6 bit mode, MSB are R/G/B[5] and R/G/B[0] are LSB
Note 2 : for 8 bit mode, MSB are R/G/B[7] and R/G/B[0] are LSB

JEIDA data mapping

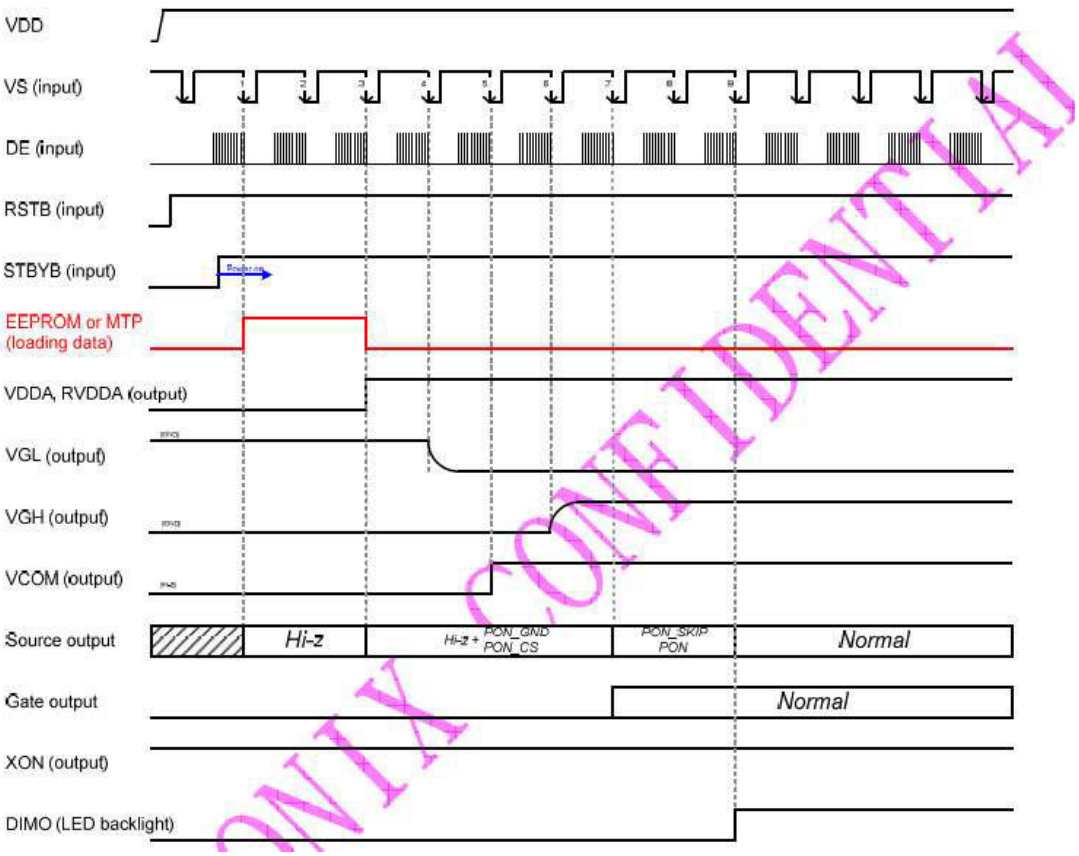


Note 1 : for 6 bit mode, MSB are R/G/B[7] and R/G/B[2] are LSB
Note 2 : for 8 bit mode, MSB are R/G/B[7] and R/G/B[0] are LSB

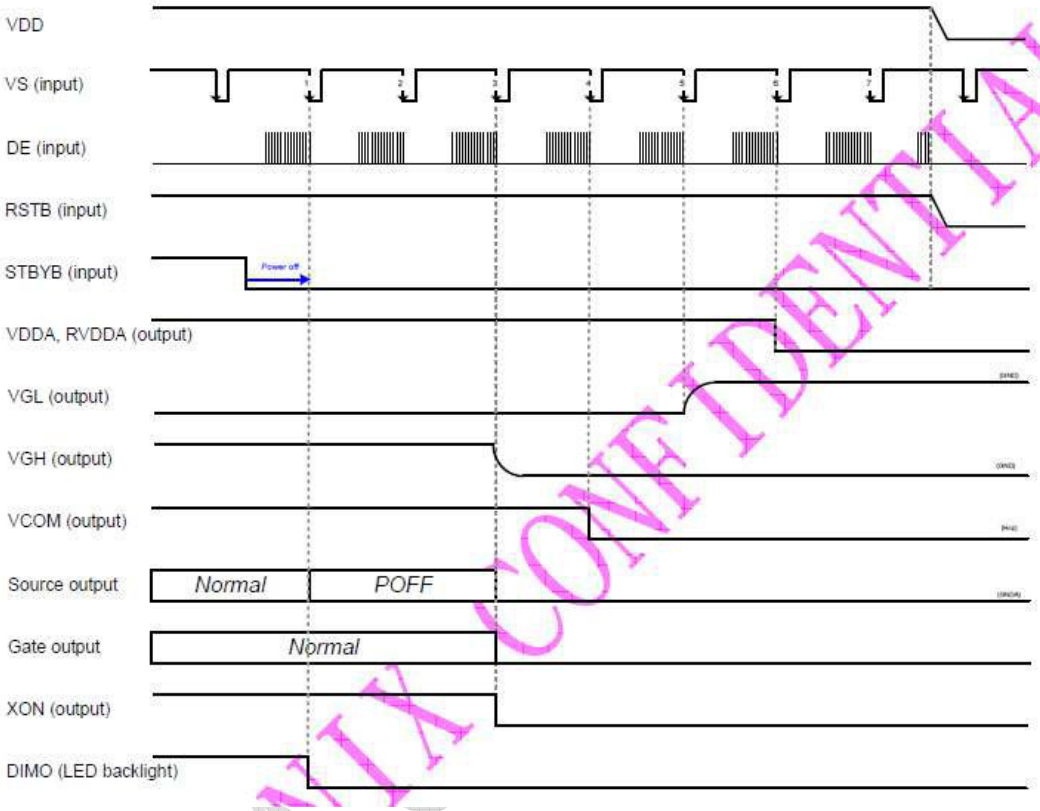
5.5 Power On/Off Timing

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON:



Power Off:

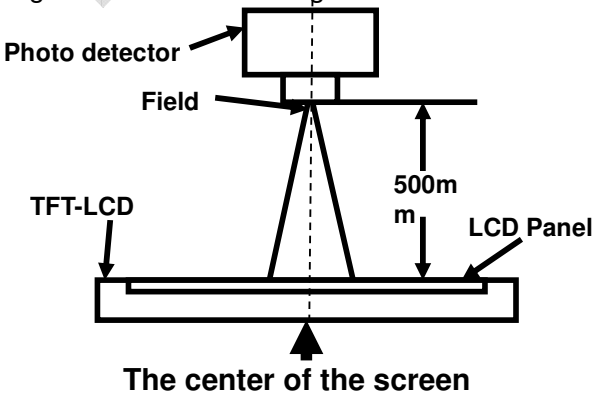


6. Optical Characteristics

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	-		
Response Time		T_{ON}	25℃	-	35	40	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x		0.256	0.306	0.356		Note5 Note1
		y		0.279	0.329	0.379		
	Red	x		0.520	0.570	0.620		
		y		0.280	0.330	0.380		
	Green	x		0.300	0.350	0.400		
		y		0.542	0.592	0.642		
	Blue	x		0.105	0.155	0.205		
		y		0.051	0.101	0.151		
Uniformity		U		70	75	-	%	Note1、Note6
NTSC				45	50	-	%	
Luminance		L		320	500	-	cd/m^2	Note7

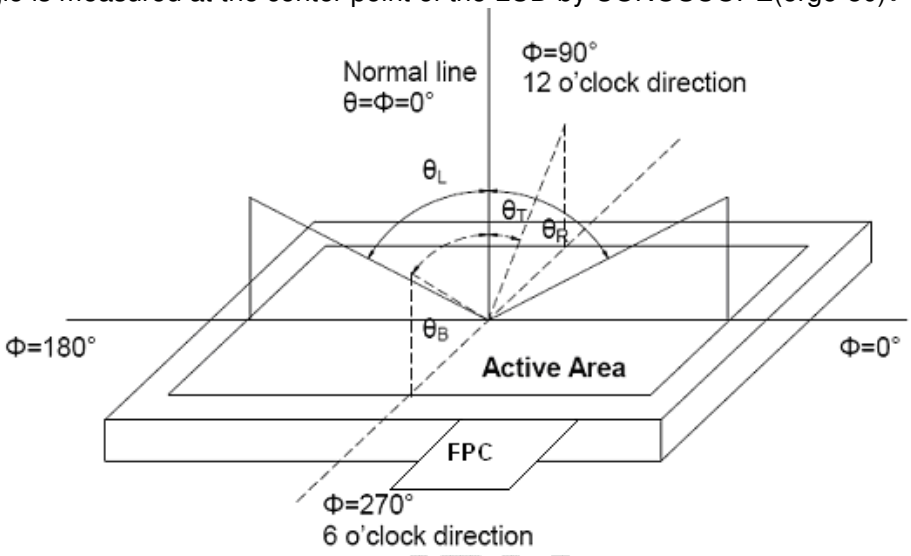
Test Conditions:
1. I_F= 20mA(one channel), the ambient temperature is 25□.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 10 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°

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)。

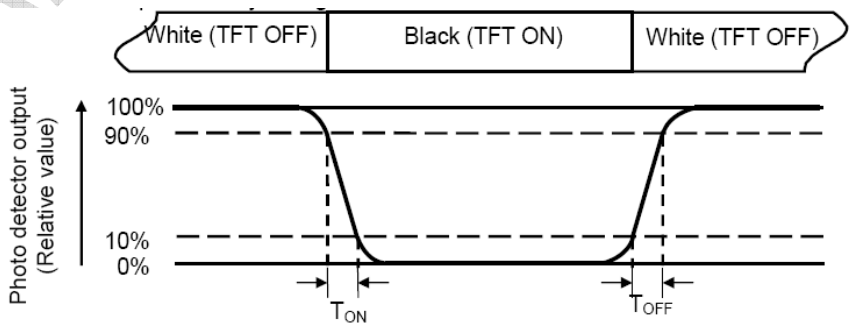


Note 3: Definition of contrast ratio

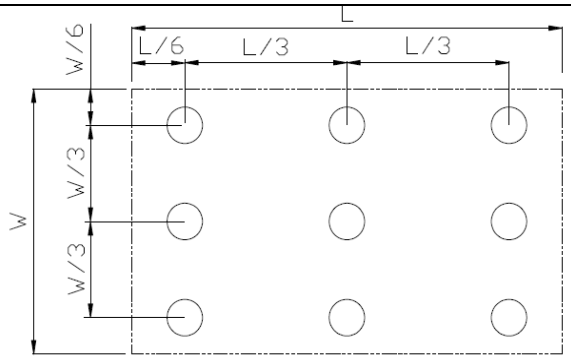
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

"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. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta = +70□, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20□, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +80□, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -30□, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	Operate at High Temperature and Humidity	Ta=+60℃、RH=90%, 240 hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃（30min）⇔80℃（30min）,Change Time:5min,20cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	ESD	C=150pF、R=330Ω Air: ±8KV　Contact:±4KV 5point/panel, 5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	Frequency range:10~55Hz Stroke: 1.5mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:60cm, 1corner,3edges,6surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Notes:

1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

1).Air bubble in the LCD;

2).Seal leak

3).Non-display

4).missing segments

5).Glass crack

6).CR reduction >40%

7).IDD increase >100%

8).Brightness reduction >50%

9).Color coordinate tolerance >0.05

3. Each test item applies for a test sample only once, The test sample can not be used again in any other test item.

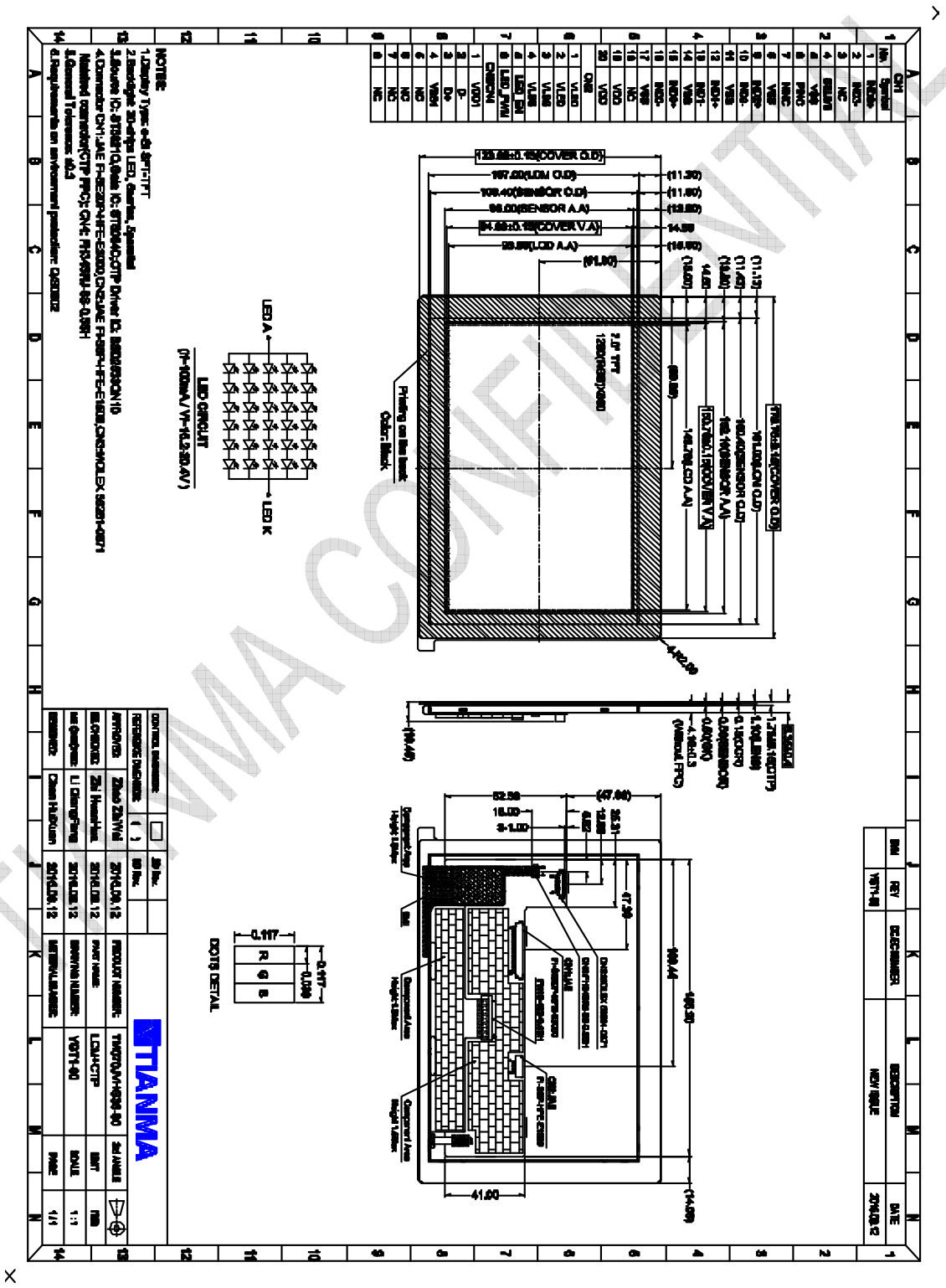
4.For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.

5.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

6 In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module

7 High Temperature Operation、Low Temperature Operation、High Temperature Storage、Low Temperature Storage、High Temperature & Humidity Operation、High Temperature & Humidity Storage will be increased the test time to 1000hours in the same conditions to test out the ability of module, and we can not guarantee that the module will not fail during 1000hours.These items test only once

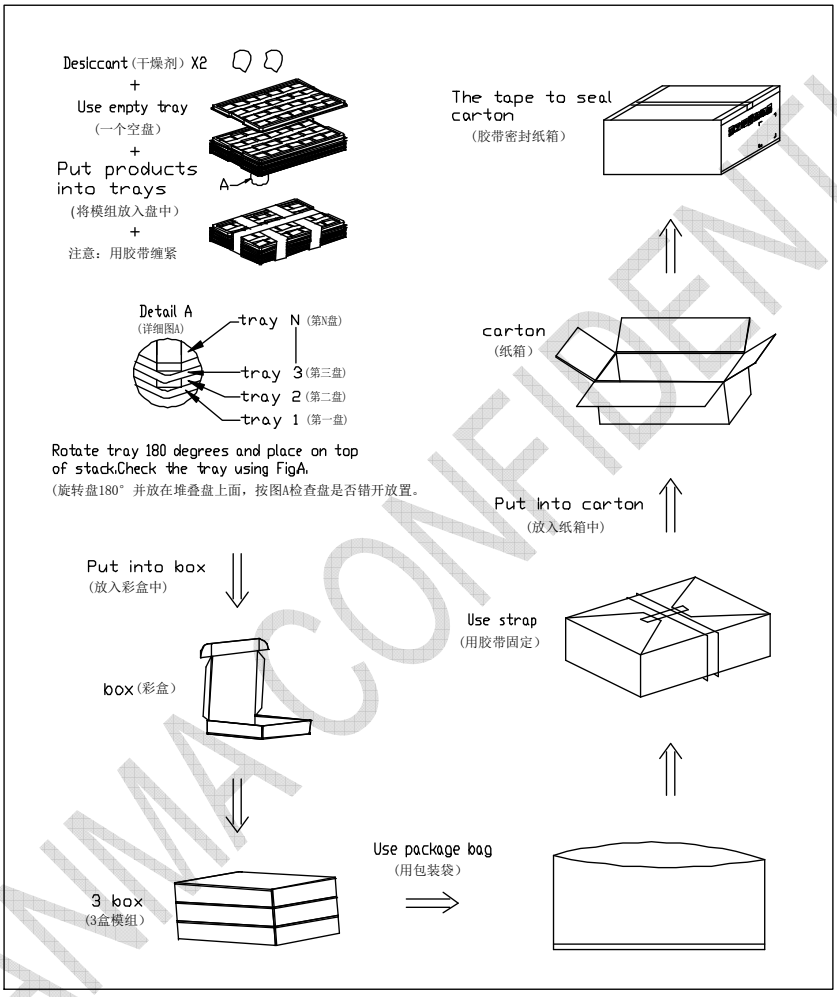
8. Mechanical Drawing



9. Packing Drawing

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity
1	LCM module	TM070JVHG33-00	179.76×123.60 × 6.35	TBD	24
2	Tray	PET（Transmit）	485×330×18.8	TBD	15
3	Dust-proof Bag	PE	700×545×0.05	TBD	1
4	BOX	CORRUGATED PAPER	520×345×74	TBD	3
5	Desiccant	Desiccant	45×35	TBD	6
6	Label	PP	100X52	TBD	1
7	Carton	CORRUGATED PAPER	544×365×250	TBD	1
8	Total weight	TBD			

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.

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

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

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

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