DATA MODUL

TIANMA

Specification

P0700WXF1ME00

7" - 1280x800 – LVDS

Spec Revision: 1.0
Revision Date: 02.08.2023

Note: This specification is subject to change without prior notice

Passion Displayed

SPECIFICATION

[◉] Preliminary Specification
[ ] Final Specification

Description **7” 1280xRGBx800 TFT-LCD Module**
Part Number **P0700WXF1ME00**
Specification Ver. **1.0**

Customer		Industrial Product Dept, PDBU Tianma Microelectronics Co., Ltd.	
Signatures	Date	Approved By	Date
		Reviewed By	
		Prepared By	
		Jacob Zhong	2023-08-02
Comments:			

* This cover page is for your Comments and Signatures back to TIANMA.

REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2023/08/02	-	Preliminary spec release	Jacob Zhong

CONTENTS

1. Summary

1.1 General Description

This is a 7 inch a-Si TFT-LCD module with Normal- Black technology. It is composed of a TFT-LCD panel, a driver circuit, and a LED backlight unit.

1.2 Features

- Ultra-wide viewing angle
- Wide temperature range
- Interface: LVDS
- Surface treatment： HC

2. General Specifications

Feature		Spec	Unit
Display Spec	Size	7 inches	
	Resolution	1280(RGB)x800	
	Pixel Pitch	0.117x0.117	mm
	TFT Active Area	149.76x93.60	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	SFT, Normally Black	
	Surface Treatment	HC	
	Viewing Direction	ALL	
Mechanical Characteristics	LCM (W x H x D)	161.0x107.0x3.35（typ）	mm
	Weight	120	g
Optical Characteristics	Luminance	400 typ	cd/m^2
	Contrast Ratio	800:1 typ	
	NTSC	50 typ	%
	Viewing Angle	88/88/88/88	degree
Electrical Characteristics	Interface	LVDS	
	Color Depth	16.7 Million	color
	Power Consumption	LCD:175 Backlight:1302	mW

Table 2.1 General TFT Specifications

3. Input / Output Terminals

3.1 CN1 Pin Assignment (LCD Interface)

Connector Information	
Matching connector	Molex 54132-4062

Table 3.1.1 Connector information

Pin No.	Symbol	I/O	function	Remarks
1	NC	--	No connection	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	--	No connection	
5	NC	--	No connection	
6	NC	--	No connection	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	-LVDS differential data input	
12	RXIN1+	I	+LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	-LVDS differential data input	
15	RXIN2+	I	+LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	-LVDS differential clock input	
18	RXCLKIN+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	-LVDS differential data input	
21	RXIN3+	I	+LVDS differential data input	
22	GND	P	Ground	
23	NC	--	No connection	
24	NC	--	No connection	
25	GND	P	Ground	
26	NC	--	No connection	
27	NC	--	No connection	
28	NC	--	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	--	No connection	
34	NC	--	No connection	
35	VGL	P	Gate Off Voltage	
36	NC	--	No connection	
37	NC	--	No connection	
38	VGH	P	Gate On Voltage	

39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Table 3.1.2 Pin Assignment for LCD Interface

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

4. Absolute Maximum Ratings

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}	-	25	mA	For each LED
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

Table 4.1 Absolute Maximum Ratings

5. Electrical Characteristics

5.1 Voltage Characteristic

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Analog Supply Voltage	AVDD	10.5	11	11.5	V	
Gate On Voltage	VGH	17.5	18.0	18.5	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 5.1.1 LCD module electrical characteristics (voltage)

5.2 Current Characteristic

Item	Min	Typ	Max	Unit	Remark
Ivdd	42.4	53	63.6	mA	
Iavdd	33.2	41.5	49.8	mA	
Ivgh	0.326	0.408	0.490	mA	
Ivgl	0.326	0.408	0.490	mA	
Ivcom	0.004	0.005	0.006	mA	

Table 5.2.1 LCD module electrical characteristics (current)

Note: test in the white picture

5.3 TFT Driving Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Forward Voltage	VLED	I_F=140mA	--	9.3	10.2	V	-
Forward Current	I_F	-	-	140	-	mA	
Backlight Power Consumption	WBL	I_F=140mA	--	1302	1428	mW	
Life Time	-	I_F=140mA	--	30,000-	-	Hrs	Note 1

Table 5.3.1 LED backlight characteristics

Note 1: 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.

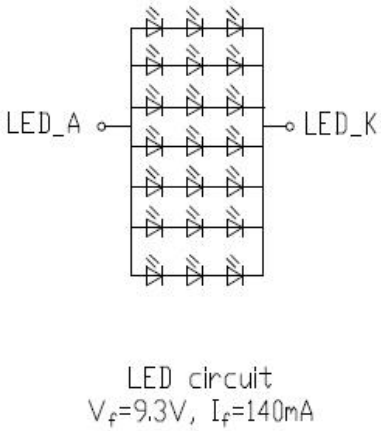


Figure 5.3.1 LED connection of backlight

5.4 LCD Module Block Diagram

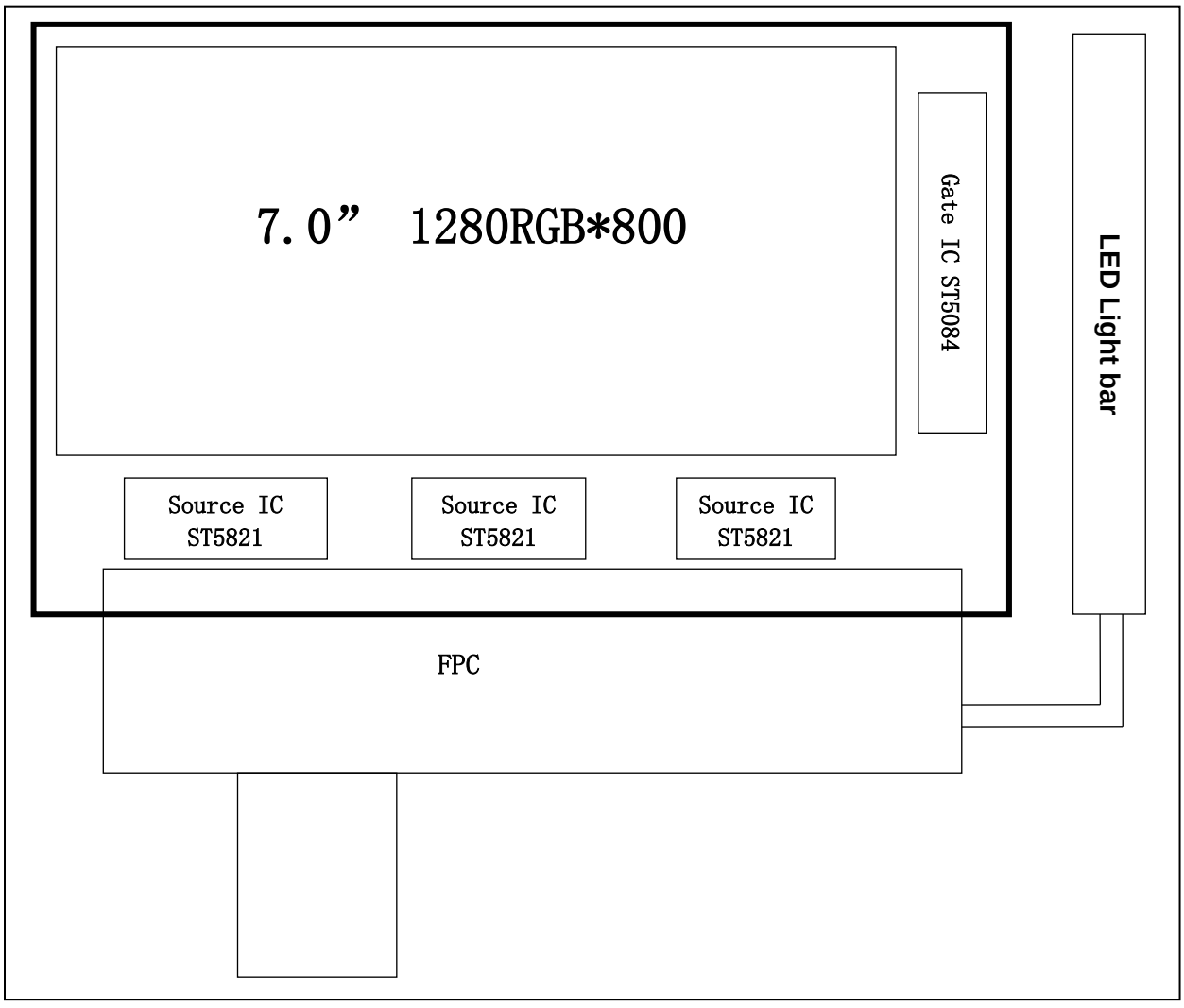


Figure 5.4.1 TFT Block Diagram

6. Interface Timing Characteristics

6.1 AC 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}	
Clock low time	T_{LVCL}	–	3/7	–	R_{xFCLK}	
PLL wake-up time	T_{enPLL}	–	–	150	us	

Table 6.1.1 AC Electrical Characteristics

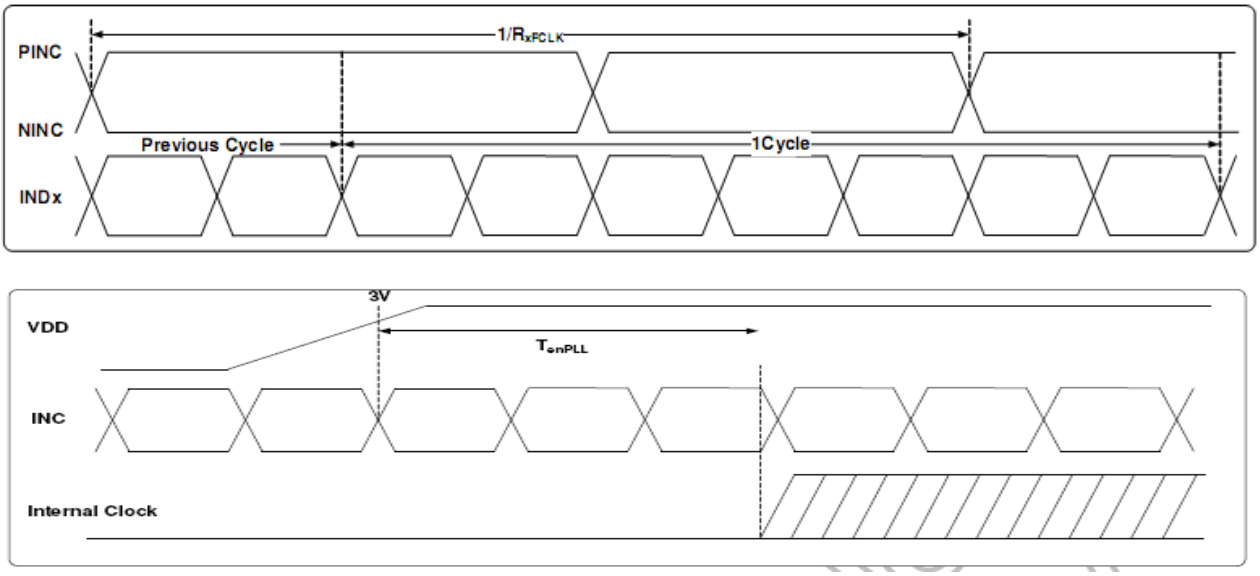


Figure 6.1.1 AC Electrical Characteristics

6.2 DC Electrical Characteristics

VGH=18V, VGL=-6.8V, VDD=3.3V, 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

Table 6.2.1 DC Electrical Characteristics

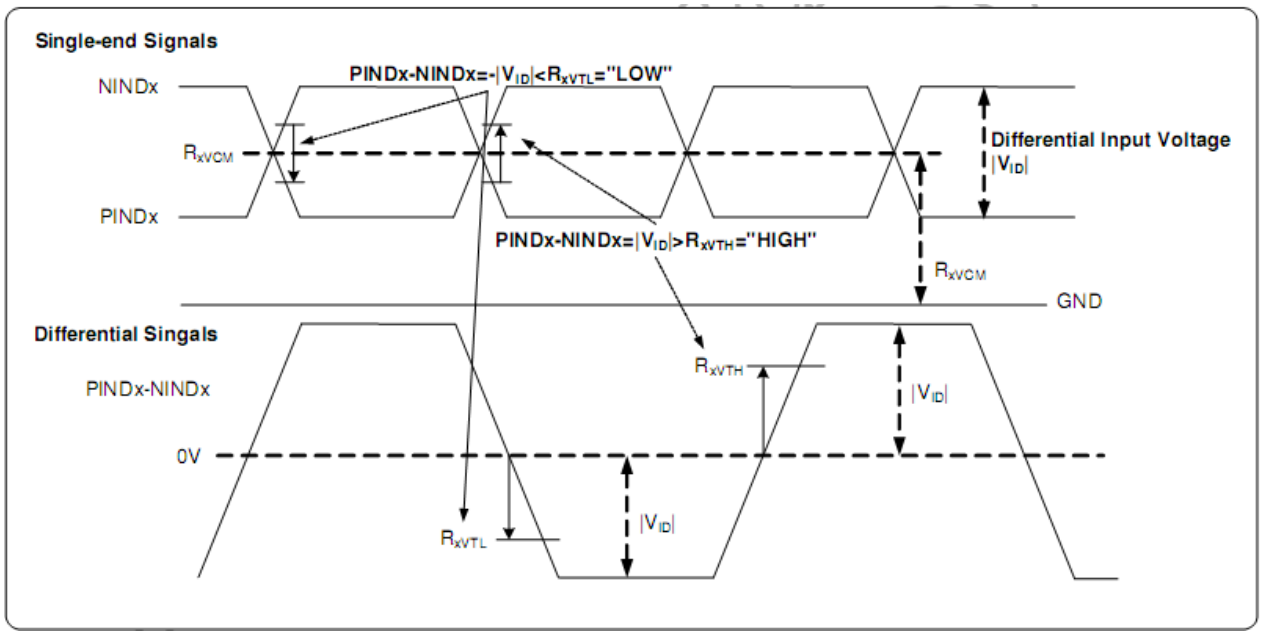


Figure 6.2.1 DC Electrical Characteristics

6.3 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}	

Table 6.3 Input timing

6.4 Data Input Format

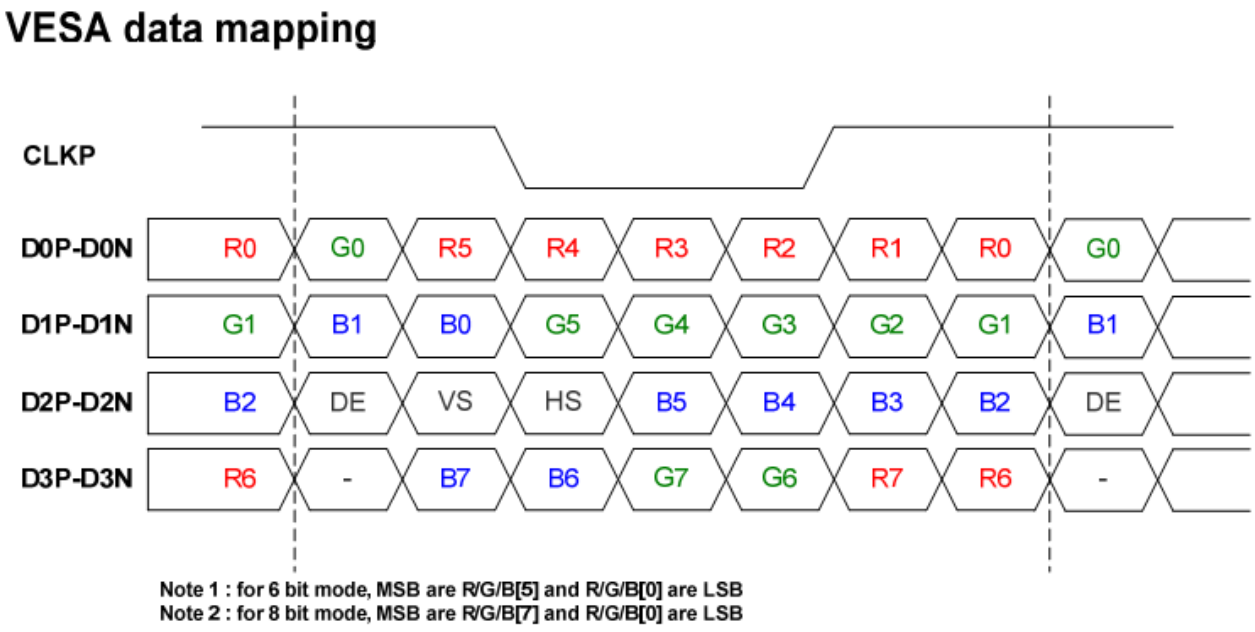
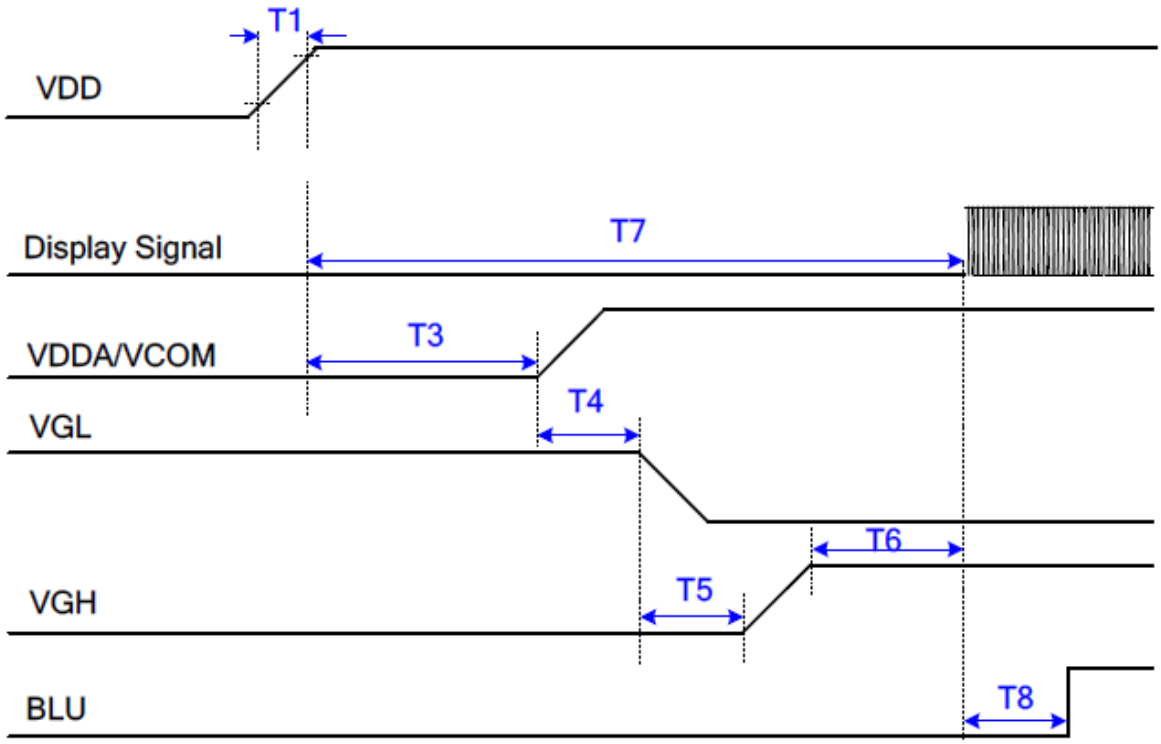


Figure 6.4.1 VESA Data input timing

6.5 Power On/Off Timing

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

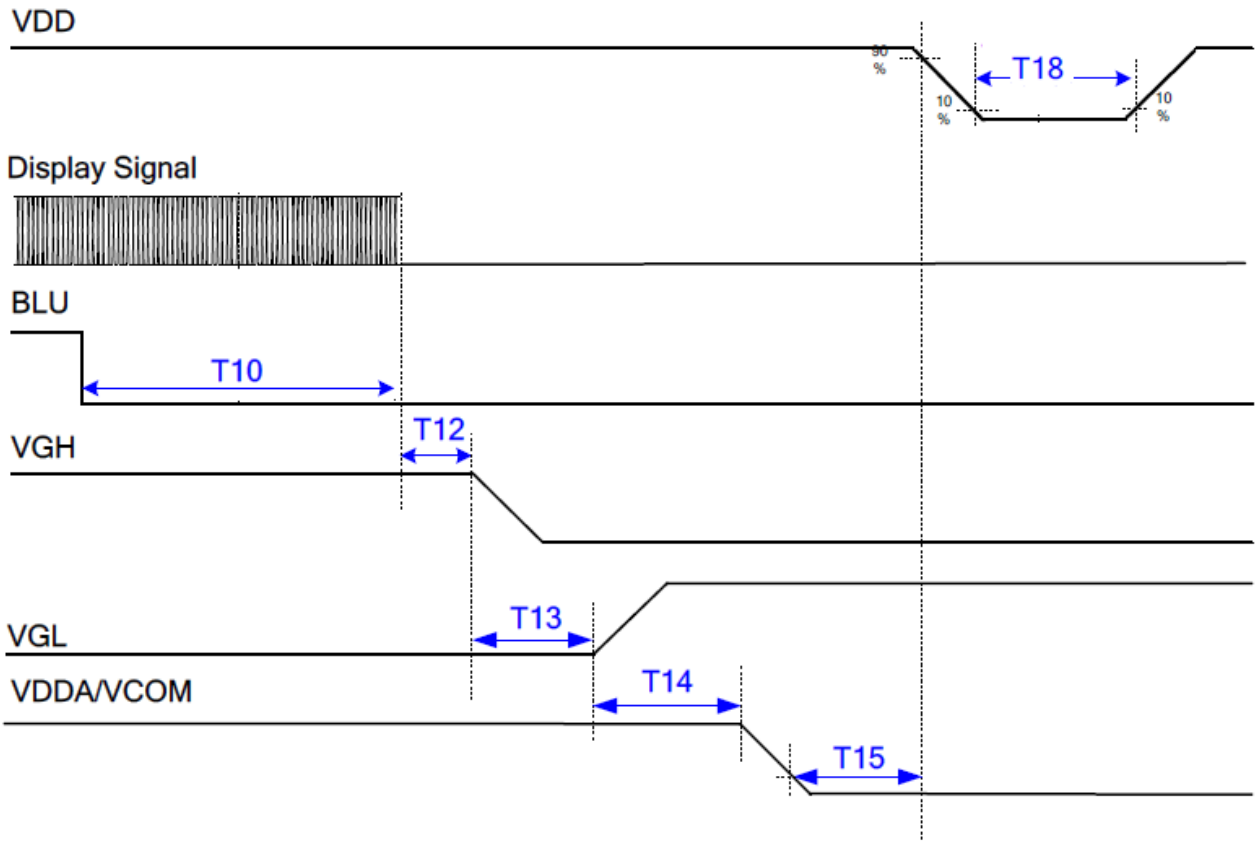
Power ON:



T1	1.5ms ≦ T1 ≦ 3ms	VDD power on slew rate (0.1 ~ 0.9*VDD)	
T3	10 ms ≦ T3 ≦ 35ms	VDD (0.9*VDD) ~ AVDD	
T4	T4 > 0ms	AVDD ~ VGL	
T5	T5 > 0ms	VGL ~ VGH	
T6	T6 > 5ms	VGH(stable) ~ Signal	
T7	10 ms ≦ T7 ≦ 100ms	VDD (0.9*VDD) ~ Signal	
T8	T8 > 10 frames	Signal ~ BLU turn on	

Figure 6.5.1 Power on timing

Power Off:



T10	T10 > 0ms	BLU turn off ~ Signal	
T12	T12 > 0ms	Signal ~ VGH	
T13	T13 > 0ms	VGH ~ VGL	
T14	T14 > 0ms	VGL ~ AVDD	
T15	T15 ≥ 1ms	AVDD (0.1*AVDD) ~ VDD (0.9*VDD)	
T18	T18 ≥ 200ms	All power off to next power on	All power should be turn off to under 10% before T18

Figure 6.5.2 Power off timing

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	80	88	-	degree	Note2,3
		θB		80	88	-		
		θL		80	88	-		
		θR		80	88	-		
Contrast Ratio		CR	θ=0°	600	800	-		Note 3
Response Time		T_{ON}	25℃	35	40		ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	0.256	0.306	0.356	±0.05	Note 1,5
		y		0.279	0.329	0.379		
	Red	x		0.520	0.570	0.620		Note 1,5
		y		0.280	0.330	0.380		
	Green	x		0.300	0.350	0.400		Note 1,5
		y		0.542	0.592	0.642		
	Blue	x		0.105	0.155	0.205		Note 1,5
		y		0.051	0.101	0.151		
Uniformity		U		70	75	-	%	Note 6
NTSC		-		45	50	-	%	Note 5
Luminance		L		320	400	-	cd/m^2	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. I_F= **20** mA, and the ambient temperature is 25℃.
2. The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical characteristics are measured at the center point of the LCD screen.

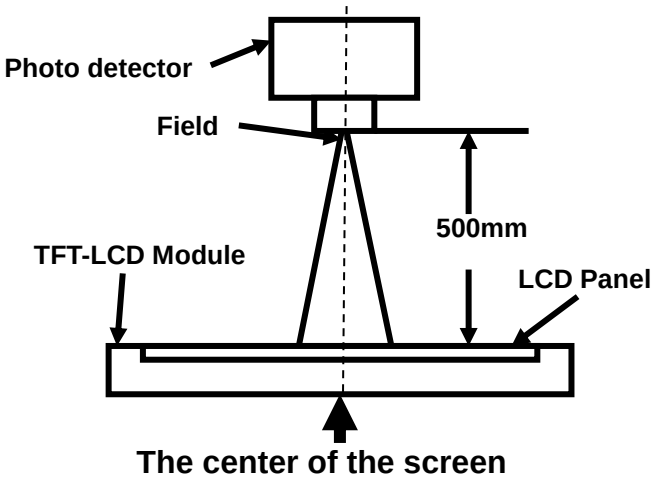


Fig1.Measurement Set Up

Note2: Definition of viewing angle range and measurement system. Viewing angle is measured at the center point of the LCD 。

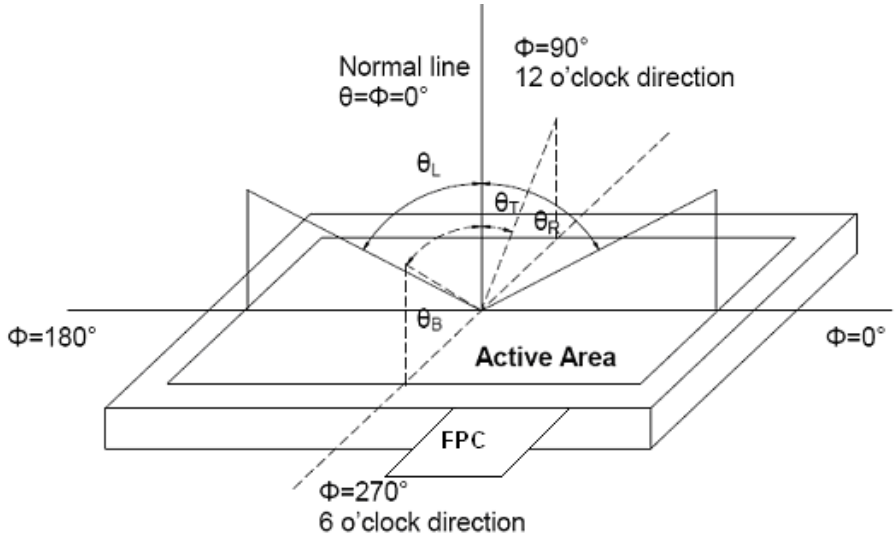


Fig2. Measurement viewing angle

Note3: Definition of contrast ratio

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

Note4: Definition of Response time

For TN LCM, the response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_r) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_f) is the time between photo detector output intensity changed from 10% to 90%.

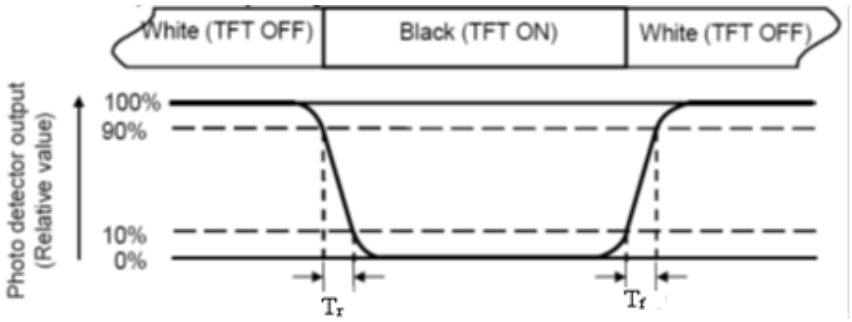


Fig3. Response Time Testing(TN)

For SFT LCM, the response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_r) is the time between photo detector output intensity changed from 10% to 90%. And fall time (T_f) is the time between photo detector output intensity changed from 90% to 10%.

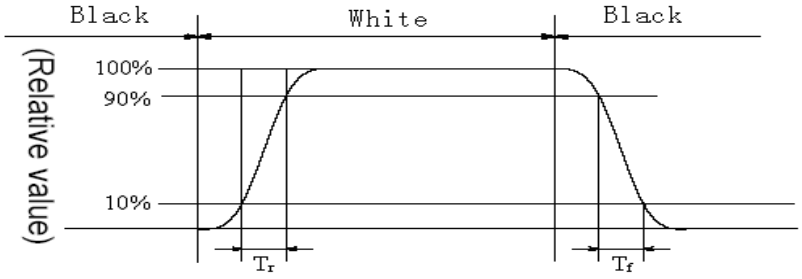


Fig4.Response Time Testing(SFT)

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig.5). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

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

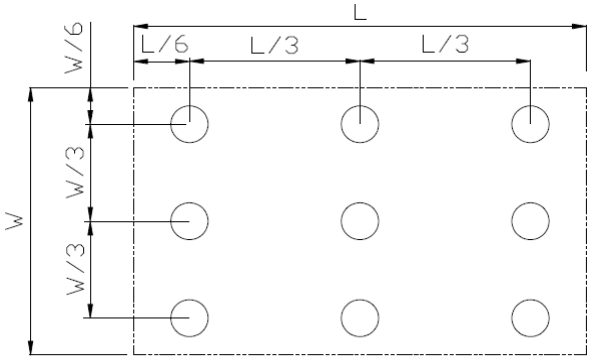


Fig5. Luminance Uniformity Measurement Locations(9 points)

Note7: Definition of Luminance:

Measure the luminance of white state at center point.

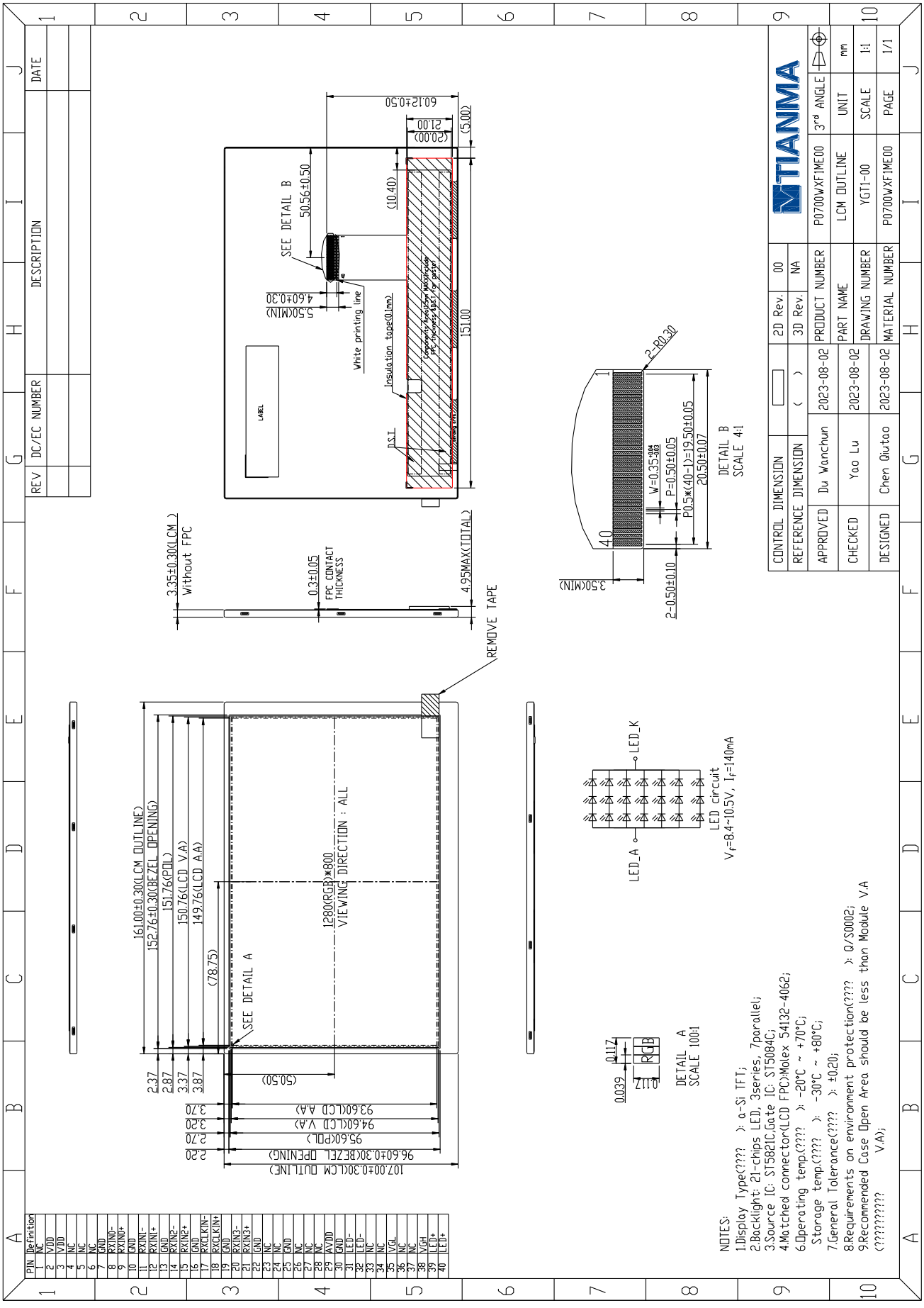
8. Reliability Test

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

Table 8.1 RA test condition

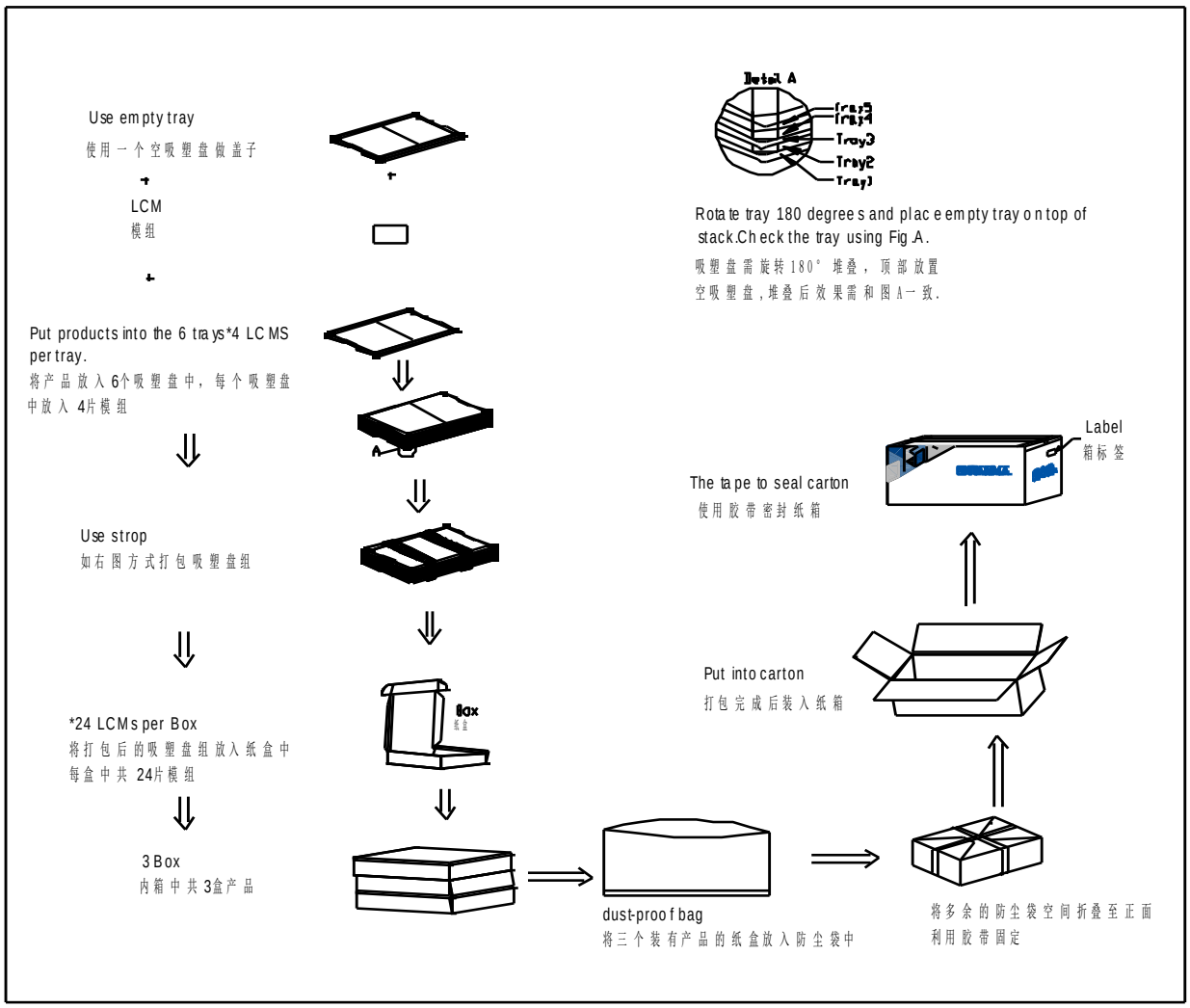
Note1: Temperature is the ambient temperature of sample
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.

9. Mechanical Drawing



10. Packing Instruction

No	Item	Model (Materiel)	Dimensions(mm)	Unit Weight(Kg)	Quantity
1	LCM	TM070JDHG30-00	161.0x107.0x3.35	0.12	72
2	Tray	PET	485×330×15.3	0.167	21
3	BOX	CORRUGATED PAPER	520×345×74	0.44	3
4	Dust-Proof Bag	LD-PE	700x545x0.05	0.046	1
5	Label	Tag board	100×52	0.002	1
6	Carton	CORRUGATED PAPER	544×365×250	1.01	1
7	Total Weight	14.5±5% kg			



11. Precautions for Use of LCD Modules

11.1 Handling Precautions

(1) The display panel is made of glass. Do not subject it to mechanical shock by dropping it, etc.
(2) If the display panel is damaged and the liquid crystal fluid inside it leaks out be sure not to get any in your mouth. If the fluid comes into contact with your skin or clothes promptly wash it off using soap and water.
(3) Do not apply excessive force to the display surface or the bezel since this may cause the color tone to vary.
(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
(5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear use a moist cloth with one of the following solvents:
- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:
- Water
- Ketone
- Aromatic solvents

(6) Do not disassemble the LCD Module.
(7) If powered off, do not apply the input signals.
(8) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
(9) Be sure to ground your body when handling the LCD Modules.
(10) Tools used for assembly, must be properly grounded.
(11) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
(12) The LCD Module is covered with a film to protect the display surface, remove film slowly under the ionizer.

11.2 Storage precautions

(1) When storing the LCD modules avoid exposure to direct sunlight or to the light of fluorescent lamps.
(2) The LCD modules should be stored within the rated storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is: Temperature: 0 ~ 35 ℃ at normal humidity.
(3) The LCD modules should be stored in a room without acid, alkali or other harmful gas.

11.3 Transportation Precautions

The LCD modules should not be dropped or subject to violent mechanical shock during transportation. Also they should avoid excessive pressure, water, high humidity and direct sunlight.

11.4 Screen saver Precautions

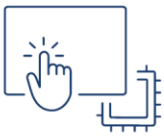
Not display the fixed pattern for a long time. Use a screen saver, if the fixed pattern is displayed on the screen

11.5 Safety Precautions

(1) When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned
(2) Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.
(3) LED driver should be designed carefully to limit or stop its function when over current is detected on the L ED.

DATA MODUL

Passion Displayed



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