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SPECIFICATION FOR LCD MODULE

客户名称(Customer)： _____

产品名称(Product) ： 5寸液晶显示屏

产品型号(Description): TB050-F4012S49A-00

Compile by 编制	Checked 审核	Approved 批准
何勇	刘波	王后勤

Customer Approve (客户确认)	QC品质	R&D研发	Approved批准

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

MINGTAI Display model XTY TB050-F4012S49A-00 is a color active matrix thin film transistor(TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a

5.0 (15:9) inch diagonally measured active display area with WVGA (480 horizontal by 272 vertical pixel) resolution.

1.2 Features

- 5.0 (15:9 diagonal) inch configuration.
- 8 bits + FRC driver with 1 channel TTL interface

1.3 Applications

- Personal Navigation Device
- Multimedia applications and Others AV system

1.4 General information

Item	Specification	Unit
Screen Size	5.0 inches	Diagonal
Number of Pixel	480 RGB (H) x 272(V)	Pixels
Display area	110.8(H) x 62.823(V)	mm
Outline Dimension	120.9 x 76.00 x3.0(Typ)	mm
Display mode	Normally white	--
Pixel arrangement	RGB Vertical stripe	--
Pixel pitch	0.077(H) x 0.231(V)	mm
Back-light	LED Side-light type	--
Surface treatment	Antiglare, Hard-Coating (3H)	--

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	120.6	120.9	121.2	mm
	Vertical (V)	75.8	76	76.2	mm
	Depth (D)	--	3.00	3.20	mm

Weight	--	66	--	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Item	Symbol	Min	Max	Unit	Note
Power supply voltage	VDD	-0.5	5.0	V	GND=0
Logic Signal Input Level	Vi	-0.3	VDD +0.3	V	

2.1.2 Back-Light Unit

Item	Symbol	Typ	Max	Unit	Note
LED current	IL		40	mA	(1)(2)(3)
LED voltage	VL		19.8	V	(1)(2)(3)

Note

(1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) Ta =25±2℃

(3) Test Condition: LED current 40 mA. The LED lifetime could be decreased if operating IL is larger than 40mA.

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-30	80	°C	
Operating temperature	T_{OPR}	-20	70	°C	

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min	Type	Max	Unit	Note
White luminance (Center)		YL		350	400		cd/m2	(1)(4)(6) (I L=40mA)
Response time		Tr	È=0 Normal Viewing Angle	-	2	4	msec	(1)(3)
		Tf		--	6	12		
Contrast ratio		CR		480	600	--	--	(1)(2)
Color Chromaticity (CIE 1931)	white	Wx		0.260	0.310	0.360		
		Wy		0.280	0.330	0.380		
Viewing Angle	Hor.	ÈL	CR 10	65	75	--		(1)(4)
		ÈR		65	75	--		
	Ver.	ÈU		50	60	--		
		ÈD		60	70	--		
Brightness uniformity		BUNI	È=0	70	--	--	%	(6)
Optima View Direction		6 o'clock						(5)

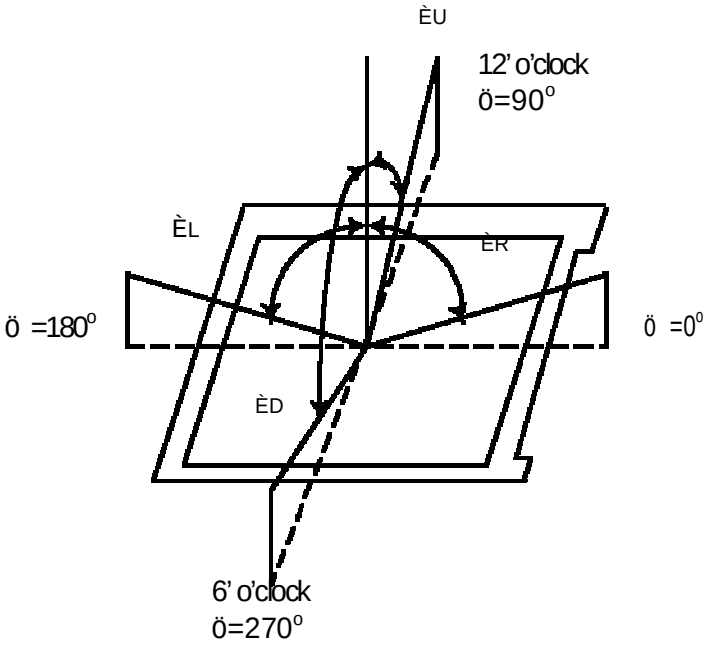
3.2 Measuring Condition

- Measuring surrounding: dark room
- LED current IL: 40mA
- Ambient temperature: 25±2oC
- 15min. warm-up time

3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size:

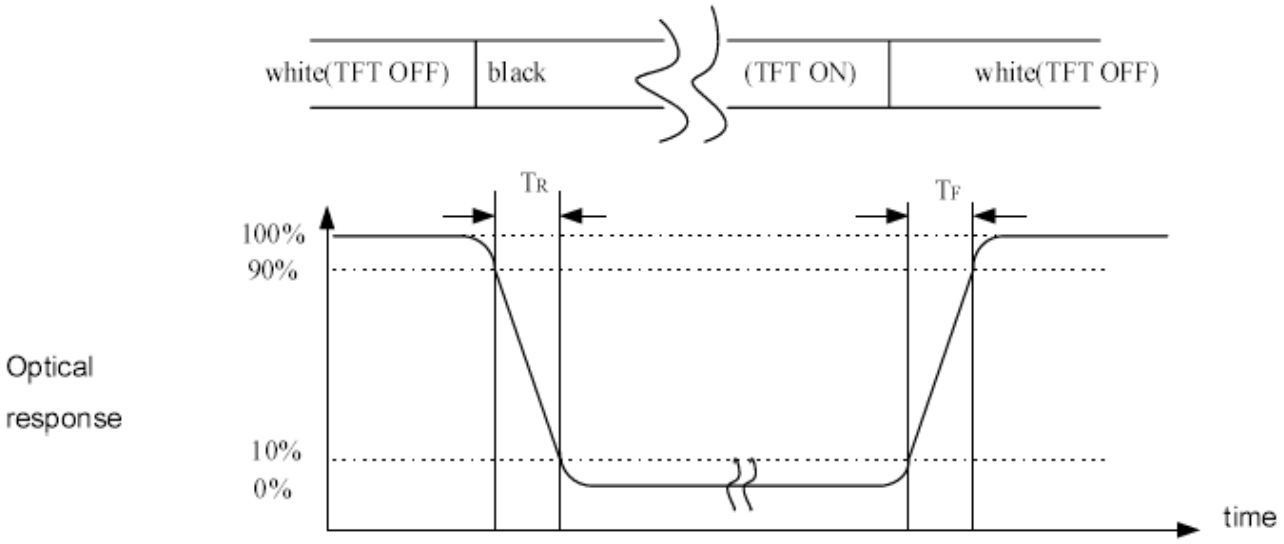
Note (1) Definition of Viewing Angle



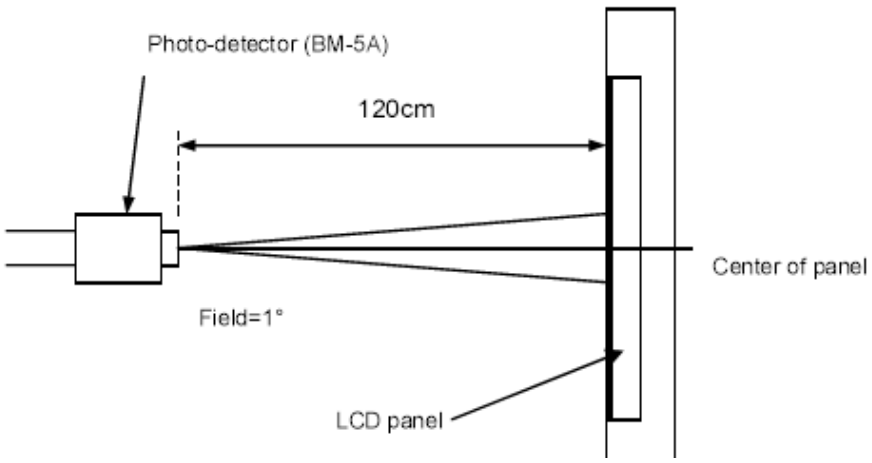
Note (2) Definition of Contrast Ratio(CR):
Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

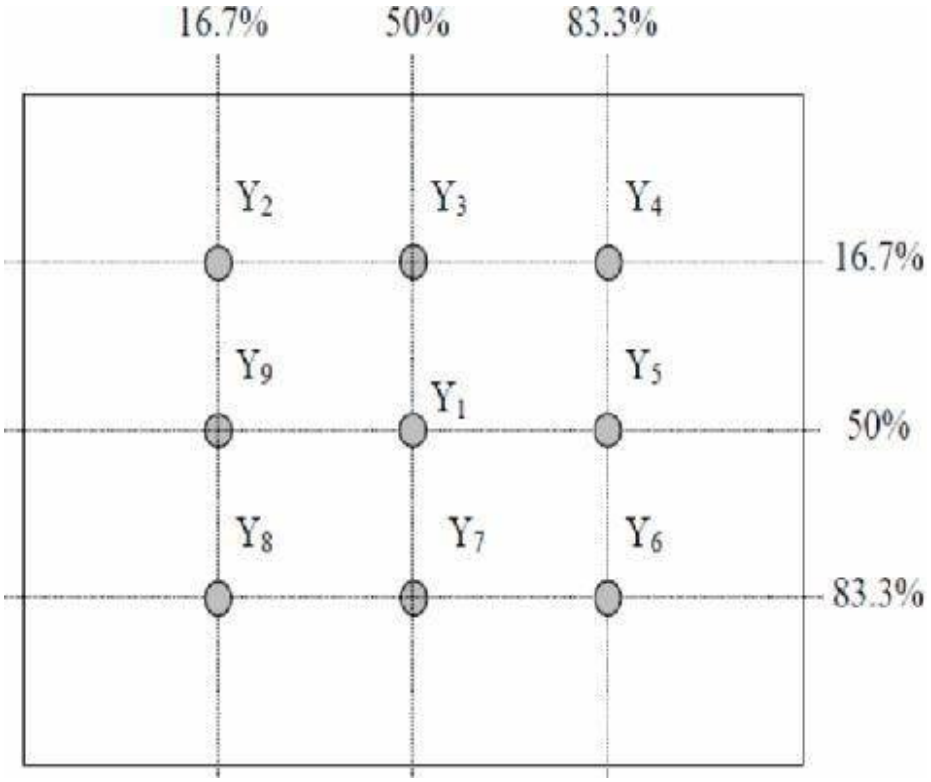
Note (3) Definition of Response Time: Sum of TR and T_F



Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



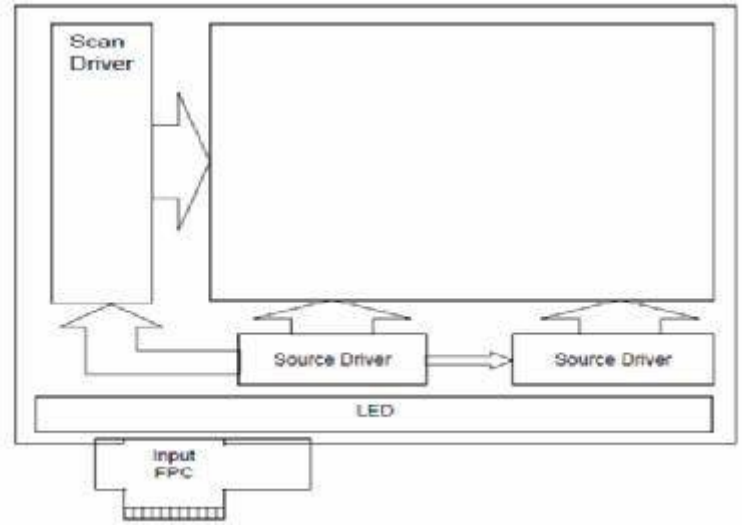
$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\ \%$$

Note (6) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

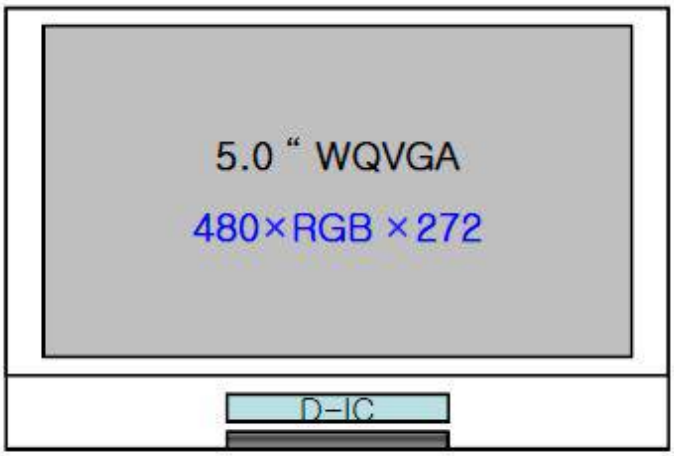
Note (7) Measured at the brightness of the panel when all terminals of LCD panel are electrically open.

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module



4.2 Pixel Format



5.0 INPUT INTERFACE PIN ASSIGNMENT

FPC connector is used for electronics interface.

The recommended model is FH19SC-40S-0.5SH (51) manufactured by HIROSE

Pin No.	Symbol	I/O	Function
1	VLED-	P	Power for LED backlight cathode
2	VLED+	P	Power for LED backlight anode
3	GND	P	Power ground
4	VDD	P	Power voltage
5	NC		
6	NC		
7	NC		
8	NC		
9	NC		
10	NC		
11	NC		
12	NC		
13	G0	I	Green data (LSB)
14	G1	I	Green data
15	G2	I	Green data
16	G3	I	Green data
17	G4	I	Green data
18	G5	I	Green data
19	G6	I	Green data
20	G7	I	Green data (MSB)
21	NC		
22	NC		
23	NC		
24	NC		
25	NC		
26	NC		
27	NC		
28	NC		
29	DGND	I	Digital ground
30	DCLK	I	Pixel clock
31	DISP	I	Display on! off
32	HSYNC	I	Horizontal sync signal
33	VSYNC	I	Vertical sync signal
34	DE	I	Data enable

35	NC	-	No Connect
36	GND	P	Power ground
37	X_R	I/O	Right electrode - differential analog
38	X_B	I/O	Bottom electrode - differential analog
39	X_L	I/O	Left electrode - differential analog
40	X_T	I/O	Top electrode - differential analog

I/O: I: input, O: output, P: power

6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	VDD	3.0	3.2	3.4	V	
Input signal Voltage	VIH	0.7 VDD	-	VDD	V	Note (1)
	VIL	GND	-	0.3 VDD	V	Note (1)
Current Power Supply	IDD	-	-	220	mA	VDD=3.3V

Note (1): HSYNC, VSYNC, DE, R/G/B Data

Note (2): GND=0V

6.2 Back-Light Unit

The backlight system is an edge-lighting type with 18 LED.

The characteristics of the LED are shown in the following tables.

Item	Symbol	Min	Typ	Max	Unit	Note
LED current	IL	-	40	-	mA	(2)
LED voltage	VL	-	18.8	-	V	
Operating LED life time	Hr	50000	-	-	Hour	(1)(2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

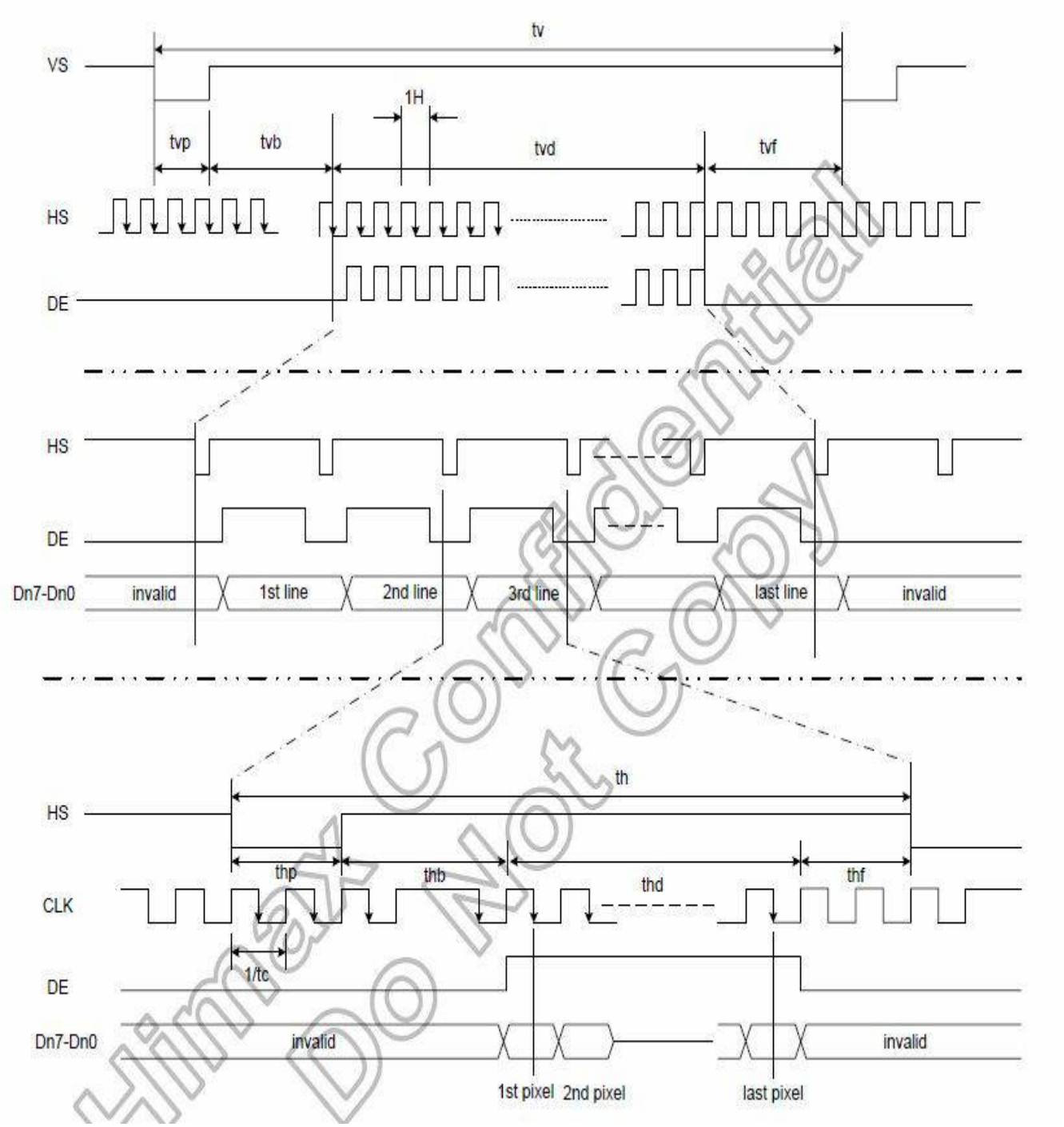
Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=40mA. The LED lifetime could be decreased if operating IL is larger than 40mA. The constant current driving method is suggested.

6.3 AC Characteristics

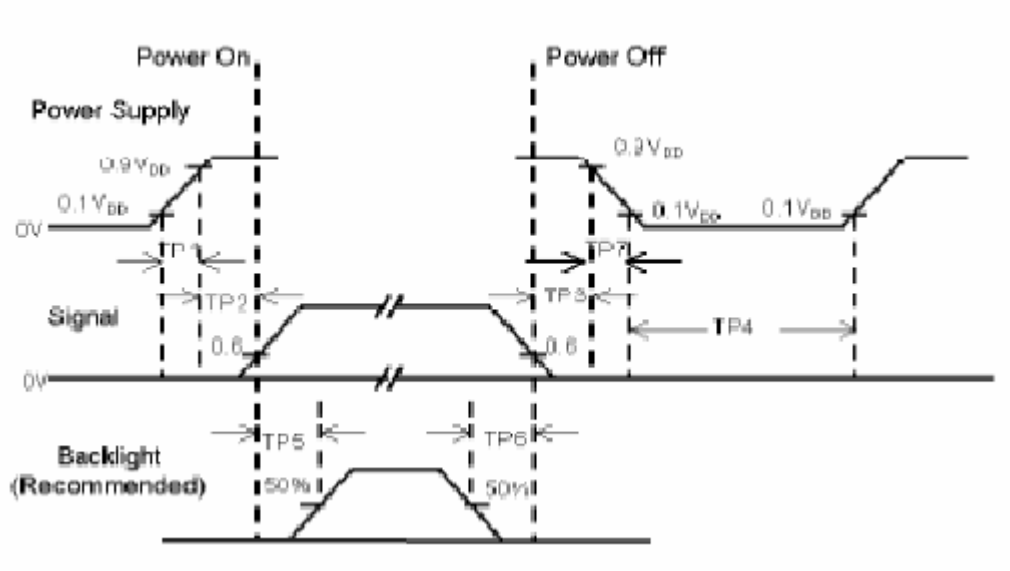
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	f_{CLK} (1)	-	9	15	MHz
Hsync cycle	1/th	-	17.14	-	KHz
Vsync cycle	1/tv	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp (2)	2	41	41	CLK
Horizontal back porch	thb (2)	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	399	H (1)
Vertical display period	tvd	272	272	272	H (1)
Vertical front porch	tvf	1	2	227	H (1)
Vertical pulse width	tvp (2)	1	10	11	H (1)
Vertical back porch	tvb (2)	1	2	11	H (1)

Note: (1) Unit: CLK=1/ f_{CLK} , H= th,
(2) It is necessary to keep tvp+tvb=12 and thp+thb=43 in sync mode. DE mode is unnecessary to keep it.

6.4 Timing Diagram of Interface Signal



6.5 Power Sequence



Note : (1) The supply voltage of the external system for the module input should be the same as the definition of VDD.

(2) Apply the lamp volatge within the LCD operation range. When the back-light turns on before the LCD operation or the LCD truns off before the back-light turns off, the display may momentarily become white.

(3) In case of VDD = off level, please keep the level of input signal on the low or keep a high impedance.

(4) TP4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

7.0 RELIABILITY TEST ITEMS

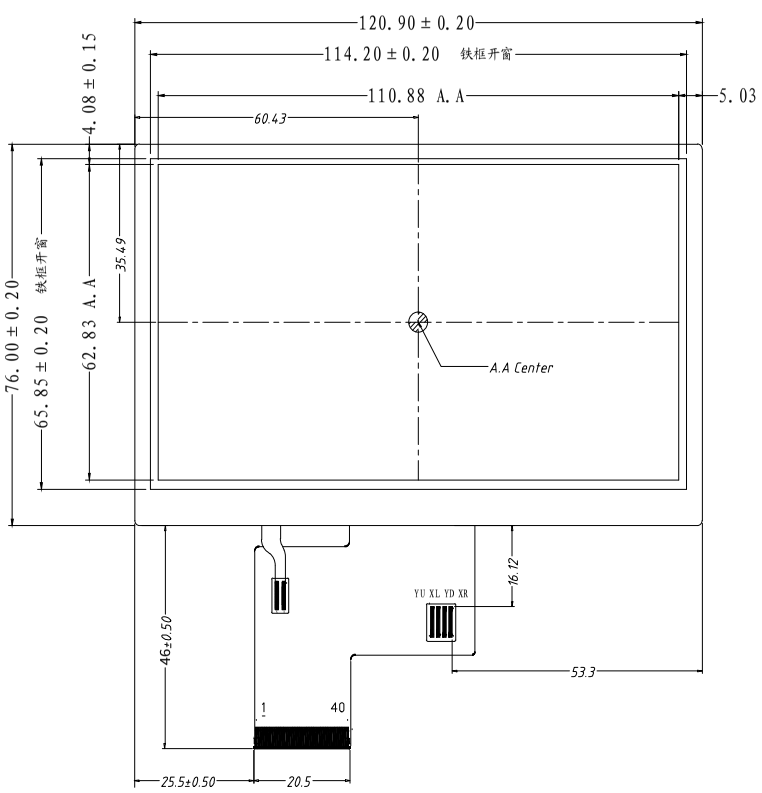
No.	Item	Conditions	Notes
1	High Temperature Storage	Ta=~80℃, 240hrs	
2	Low Temperature Storage	Ta=-30℃, 240hrs	
3	High Temperature Operation	Ta=~70℃, 240hrs	
4	Low Temperature Operation	Ta=-20℃, 240hrs	
5	High Temperature and High Humidity (operation)	Ta=~60℃, 90%RH, 240hrs	
6	Thermal Cycling Test (non operation)	-30℃(30min) → ~80℃(30min), 200cycles	
7	Electrostatic Discharge	±200V,200pF(0_) 1 time/each terminal	
8	Vibration	1 .Random: 1 .04Grms, 5~500Hz, X/Y/Z, 30min/each direction 2. Sine: Freq. Range: 8~33.3Hz Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hr, Y: 4hr, cyc: 15min	
9	Shock	100G, 6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
10	Vibration (with carton)	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ each direction: 2hr	
11	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202

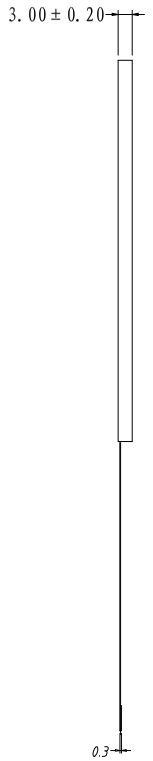
Note: There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

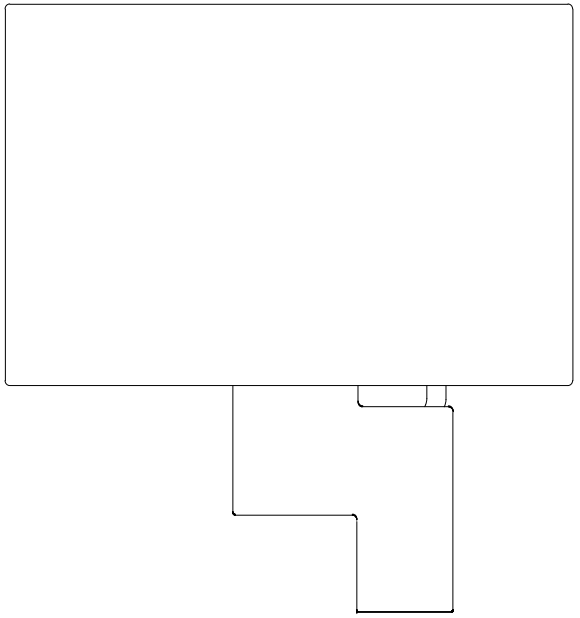
深圳市新天源电子有限公司

SHENZHEN XINTIANYUAN ELECTRONICS CO.,LTD.

第三角法

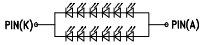






BL LED 电路图：

6串2并 I=40mA



1 DISPLAY: 5"TFT TRANSMISIVE
2 VIEW DIRECTION:6 0'CLOCK
3 DRIVER IC:
4 OPERATION TEMP.: -20°C~+70°C
5 STORAGE TEMP.: -30°C~+80°C
6.UNSPECIFIED TOLERANCES IS ±0.2mm
7 ALL MATERIAL AND PROCESSING SHOULD BE LEAD FREE
8 CRITICAL DEMENSION MARKED *

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PART NO. 产品料号	TYPE 类型	5寸普清显示模组	MATERIAL 材料		DESIGN 设计	
			DATE 日期	2016.6.6	CHECKED 检查	
	EDITION 版本	A1	PAGE 页码	1/1	APPROVED 批准	

10.0 LOT MARK

10.1 Location of Lot Mark

(1) Location: The label is attached to the backside of the LCD module.

(2) Detail of the Mark: as attached below.

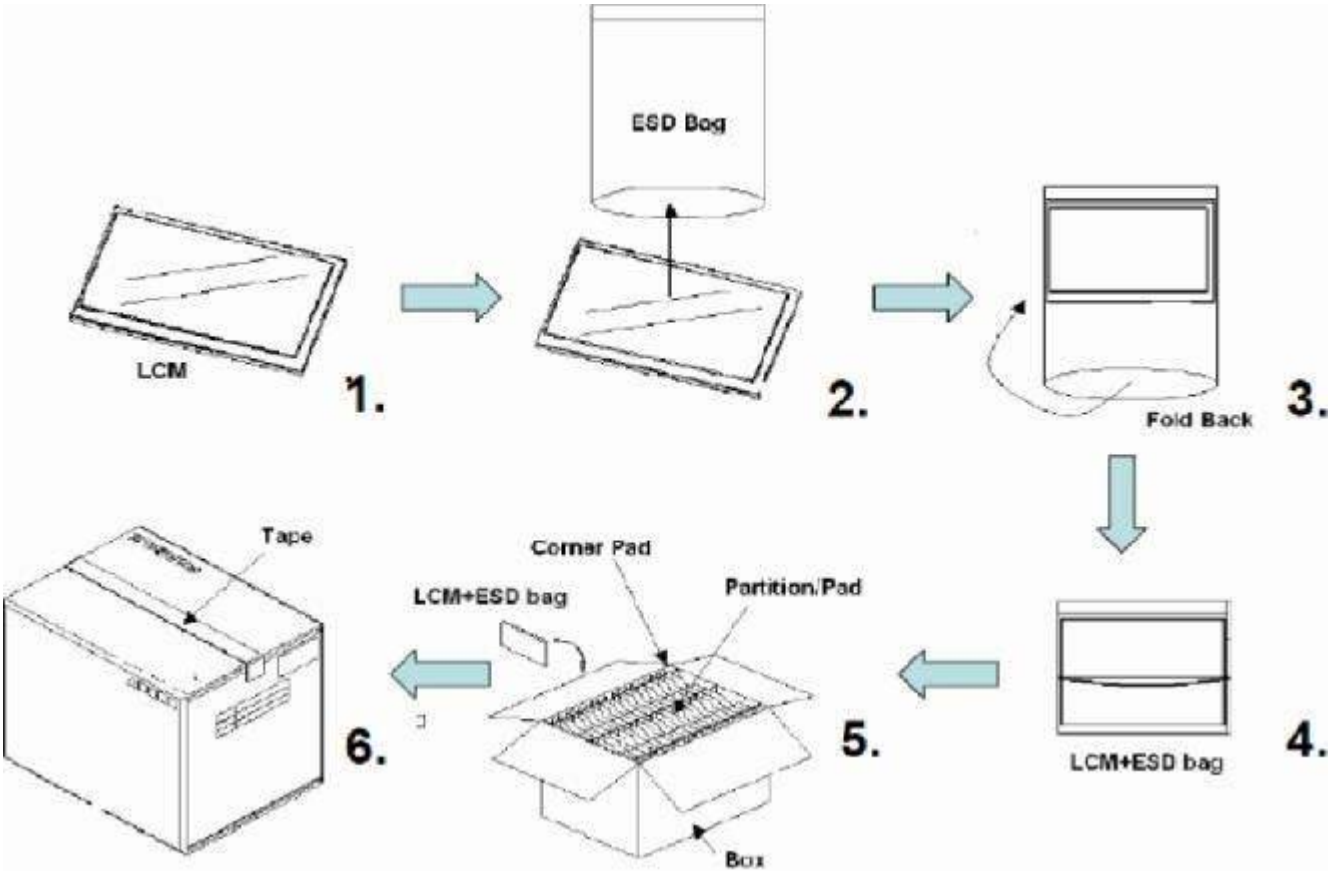
(3) This is subject to change without prior notice.

11.0 PACKAGE SPECIFICATION

11.1 Packing form

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Notice
TB050-F4012N39c-00	150 pcs/box	460±5 x 370±5 x 190±5	

11.2 Packing assembly drawings



Items	Material	Notice
Box	Corrugated Paper Board	AB Flute
Partition/Pad	Corrugated Paper Board	A/B Flute
Corner Pad	Corrugated Paper Board	AB Flute
ESD bag	PE	