深圳市勋瑞光电科技有限公司
Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

Product Specification

Customer:	
Model Name:	H062AWS50I4010
Date:	2024-01-25
Version:	V0

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Revision Record

REV NO.	REV DATE	CONTENTS	Note
V0	2024.01.25	NEW ISSUE	

Table of Contents

List	Description	Page No.
	Cover	1
	Revision Record	2
	Table of Contents	3
1	Scope	4
2	General Information	4
3	External Dimensions	5
4	Interface Description	6
5	Electrical specification	7
6	Absolute Maximum Ratings	8
7	Timing Characteristics	9
8	Backlight Characteristics	13
9	Optical Characteristics	14
10	Reliability Test Conditions and Methods	16
11	Inspection Standard	17
12	Handling Precautions	22
13	Precaution for Use	23
14	Packing Method	23

![深圳市勋瑞光电科技有限公司 Xunrui Shenzhen Optoelectronics Technology Co., Ltd.]
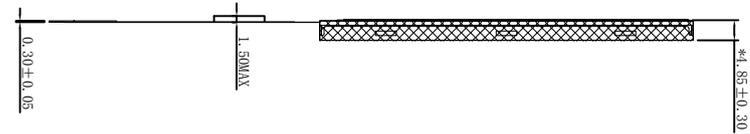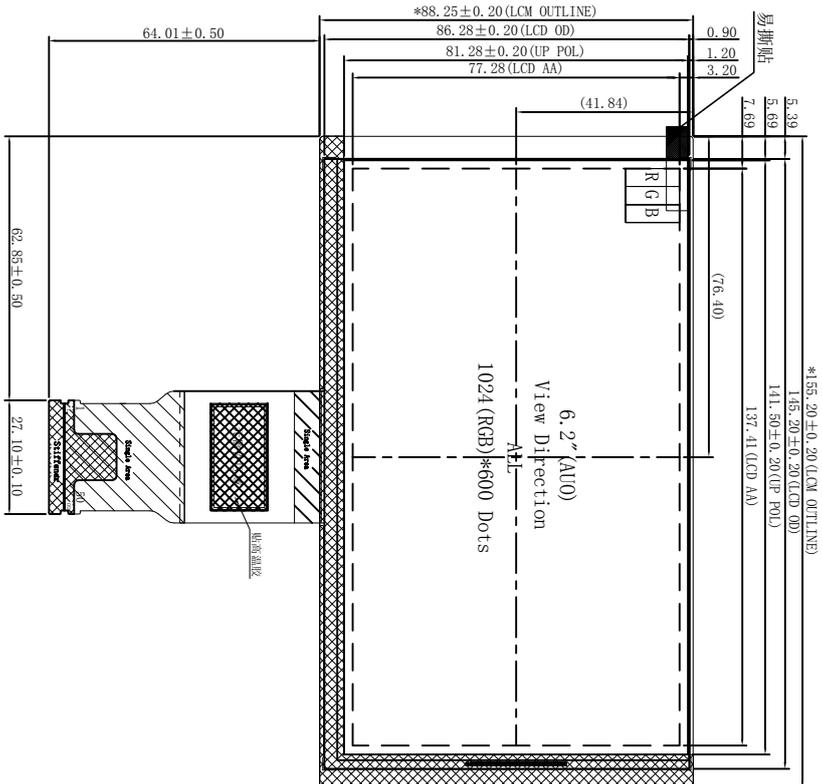
1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by

If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution
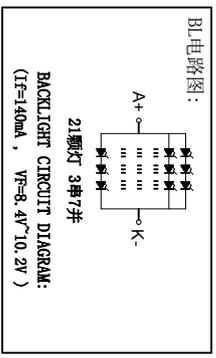
2. General Information

TITEM	STANDARD VALUES	UNITS
LCD type	6.2"TFT	--
Dot arrangement	1024(RGB)×600	dots
Color filter array	RGB vertical stripe	--
Display mode	Normally Black , Transmissive	-
Gray Scale Inversion Direction	ALL	--
Eyes Viewing Direction	80/80/80/80	
Module size	155.20(W)×88.25(H)×4.85(T)	mm
Active area	154.21(W)×85.92(H)	mm
Dot pitch	0.1342(W)×0.1288(H)	mm
Interface	TTL	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	21White LED	--
Weight	TBD	g

3. External Dimensions

NOTES:

1. DISPLAY TYPE: 6.2 INCH TFT /Normally Black Transmissive
2. BACKLIGHT: 21 CHIP WHITE LED, IN PARALLEL
3. OPERATING TEMP: -20°C~+70°C
4. STORAGE TEMP: -30°C~+80°C
5. RESOLUTION: 1024RGBx600
6. LCD IC: TBD
7. Typical Lumiance:400cd/m2(MIN), 450cd/m2(TYP)
8. "( )"reference dimension. " * "critical dimension
9. RoHS Compliant

BL电路图:

BACKLIGHT CIRCUIT DIAGRAM:
21颗灯 3串7并
(IF=140mA, VF=8.4V~10.2V)

A+ ○—

K- ○—

*88.25±0.20(LCM OUTLINE)
86.28±0.20(LCD OD)
81.28±0.20(UP POL)
77.28(LCD AA)
(41.84)

0.90
1.20
3.20
5.39
5.69
7.69

R G B

6.2"(AU0)
View Direction
1024(RGB)*600 Dots

64.01±0.50
62.85±0.50
27.10±0.10

(76.40)

*155.20±0.20(LCM OUTLINE)
145.20±0.20(LCD OD)
141.50±0.20(UP POL)
137.41(LCD AA)

0.30±0.05
1.50MAX
*4.85±0.30

H062AWS50I4010
生产日期

3.80±0.30
W0.30±0.05
1.30±0.10
2-0.78
2-2.80
2-4.60
2-7.40
P0.5*(50-1)=24.50±0.10

PI Stiffener

INTERFACE	RGB Interface
VIEWING DIRECTION	ALL
Gray Scale DIRECTION	FREE

MODEL NAME	TFT Display Module
PART NO.	H062AWS50I4010
REV.	A0
SHEET OF	1/1
TOLERANCE UNLESS SPECIFIED	±0.5
UNIT	mm
SCALE	1:1

FPC Connector
DWN
CHKD
PROJECTION
3RD ANGLE

PIN	ASSIGN	PIN	ASSIGN
1	VLEH	26	G1
2	VLEH	27	G0
3	VLEL	28	R7
4	VLEL	29	R6
5	GND	30	R5
6	VCOM	31	R4
7	DVDD	32	R3
8	MODE	33	R2
9	DE	34	R1
10	VS	35	R0
11	HS	36	GND
12	B7	37	DCLK
13	B6	38	GND
14	B5	39	L/I
15	B4	40	U/I
16	B3	41	VGL
17	B2	42	VGH
18	B1	43	AVD
19	B0	44	RESI
20	G7	45	NC
21	G6	46	VCOM
22	G5	47	DITT
23	G4	48	GNI
24	G3	49	NC
25	G2	50	NC

A0
2023.11.23
First issue

4. Interface Description

PIN	PIN NAME	DESCRIPTION
1	VLED+	LED backlight (Anode).
2	VLED+	
3	VLED-	LED backlight (Cathode).
4	VLED-	
5	GND	Power ground
6	VCOM	Common Voltage.
7	DVDD	Digital Power.
8	MODE	DE/SYNC mode select. Normally pull high. H: DE mode. L: HSD/VSD mode.
9	DE	Data Enable signal.
10	VS	Vertical sync input. Negative polarity.
11	HS	Horizontal sync input. Negative polarity.
12	B7	Blue Data Input (MSB).
13	B6	Blue Data Input.
14	B5	Blue Data Input.
15	B4	Blue Data Input.
16	B3	Blue Data Input.
17	B2	Blue Data Input.
18	B1	Blue Data Input.
19	B0	Blue Data Input (LSB).
20	G7	Green Data Input (MSB).
21	G6	Green Data Input.
22	G5	Green Data Input.
23	G4	Green Data Input.
24	G3	Green Data Input.
25	G2	Green Data Input.
26	G1	Green Data Input.
27	G0	Green Data Input (LSB).
28	R7	Red Data Input (MSB).
29	R6	Red Data Input.
30	R5	Red Data Input.
31	R4	Red Data Input.
32	R3	Red Data Input.
33	R2	Red Data Input.
34	R1	Red Data Input.
35	R0	Red Data Input (LSB).
36	GND	Power ground.
37	DCLK	Clock input.
38	GND	Power ground.

39	L/R	Left or Right Display Control.	Note1
40	U/D	Up / Down Display Control.	Note1
41	VGH	Positive Power for TFT.	
42	VGL	Negative Power for TFT.	
43	AVDD	Analog Power.	
44	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high.(R=10KΩ, C=1µF)	
45	NC.	Not connect.	
46	VCOM	Common Voltage.	
47	DITHB	Dithering function enable control. (Normally pull high) DITHB="L", to enable internal dithering function. DITHB="H", to disable internal dithering function.	
48	GND	Power ground.	
49	NC.	Not connect.	
50	NC.	Not connect.	

When RGB 666 is used, R2 to R7, G2 to G7, B2 to B7 are used, and no data cable is connected to GND
Note2:Data shall be latched at the falling edge of DCLK

Note 1 : Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV$_{DD}$	Up to down, left to right
DV$_{DD}$	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV$_{DD}$	DV$_{DD}$	Down to up, left to right
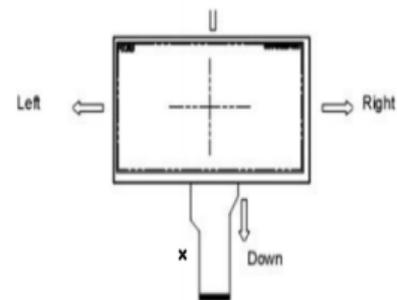
5. Electrical specification

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Input signal Voltage	VCOM	-	4.2	-	V	-
Logic Supply Voltage	DVDD	2.3	3.3	3.6	V	
Analog Supply Voltage	AVDD	12.5	13	13.5	V	
Low Supply Voltage	VGL	-9.5	-9	-8.5	V	-
High Supply Voltage	VGH	19.5	20	20.5	V	
Output High Voltage	VIH	0.7XVDD	-	VDD	V	-
Output Low Voltage	VIL	0	-	0.3xVDD	V	-

Note 1: Please adjust VCOM to make the flicker level be minimum. Typ VCOM 电压值只做参考，具体以实际效果为准（根据**FLICKER** 状态可调整）

Note 2: The gate IC is the HX8696-A, The source IC is the HX8282-A

6. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	DVDD	-0.5	3.96	V
Analog Supply Voltage	AVDD	-0.5	14.85	V
High Supply Voltage	VGH	-0.3	40	V
Low Supply Voltage	VGL	-20	0.3	V
Operating Temperature	T_{OP}	-20	70	°C
Storage Temperature	T_{ST}	-30	80	°C

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	0.2	1.0	mA	$V_{GH} = 20V$
	I_{GL}	-	0.2	1.0	mA	$V_{GL} = -9V$
	IDV_{DD}	-	12	20	mA	$DV_{DD} = 3.3V$
	IAV_{DD}	-	20	50	mA	$AV_{DD} = 13V$

7. Timing Characteristics

7.1 POWER ON/OFF SEQUENCE

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

Power on: VDD, GND _ AVDD, AGND _ V1 to V14

Power off: V1 to V14 _ AVDD, AGND_ VDD, GND

Power on/off control
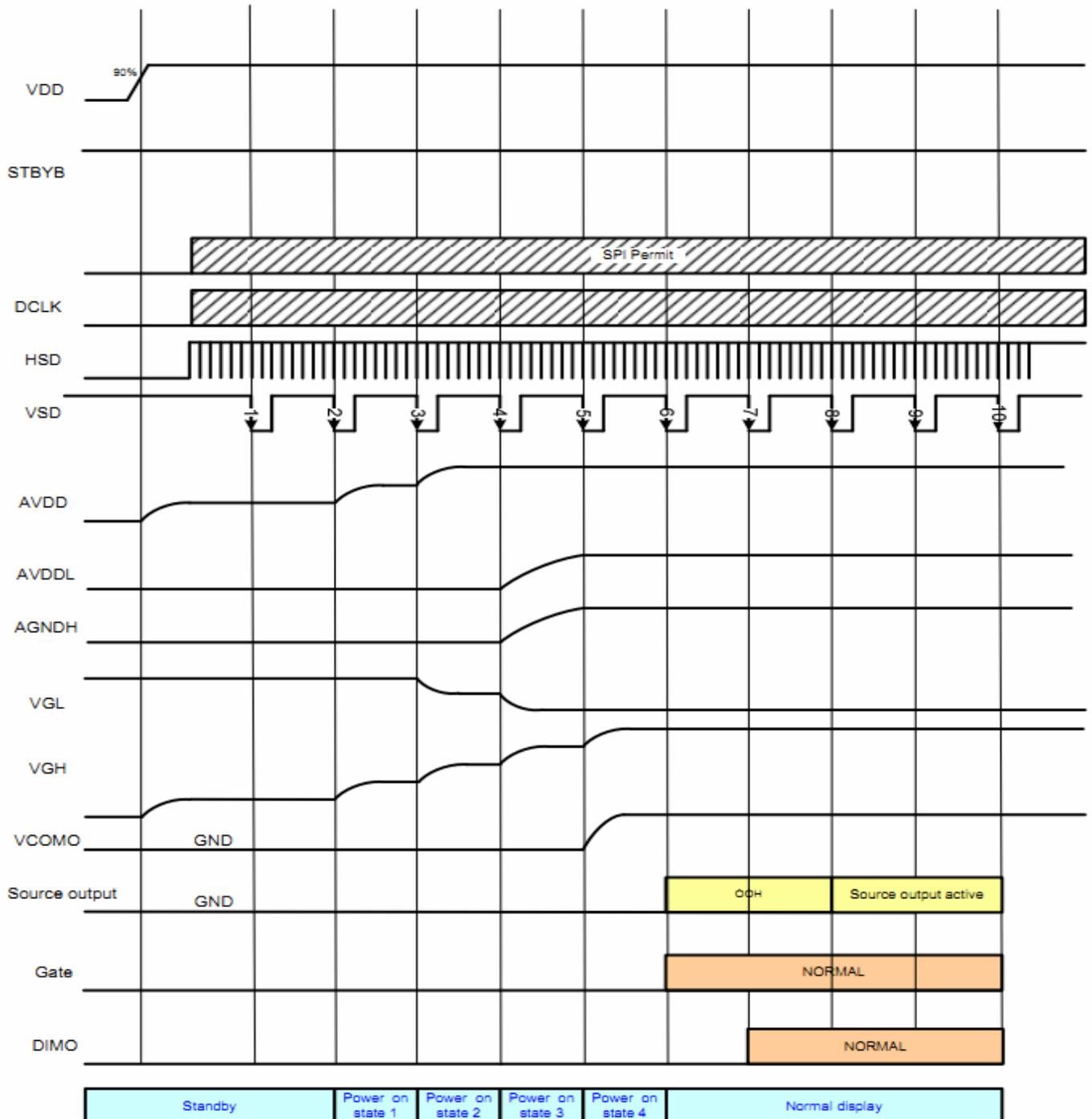
Power on timing sequence
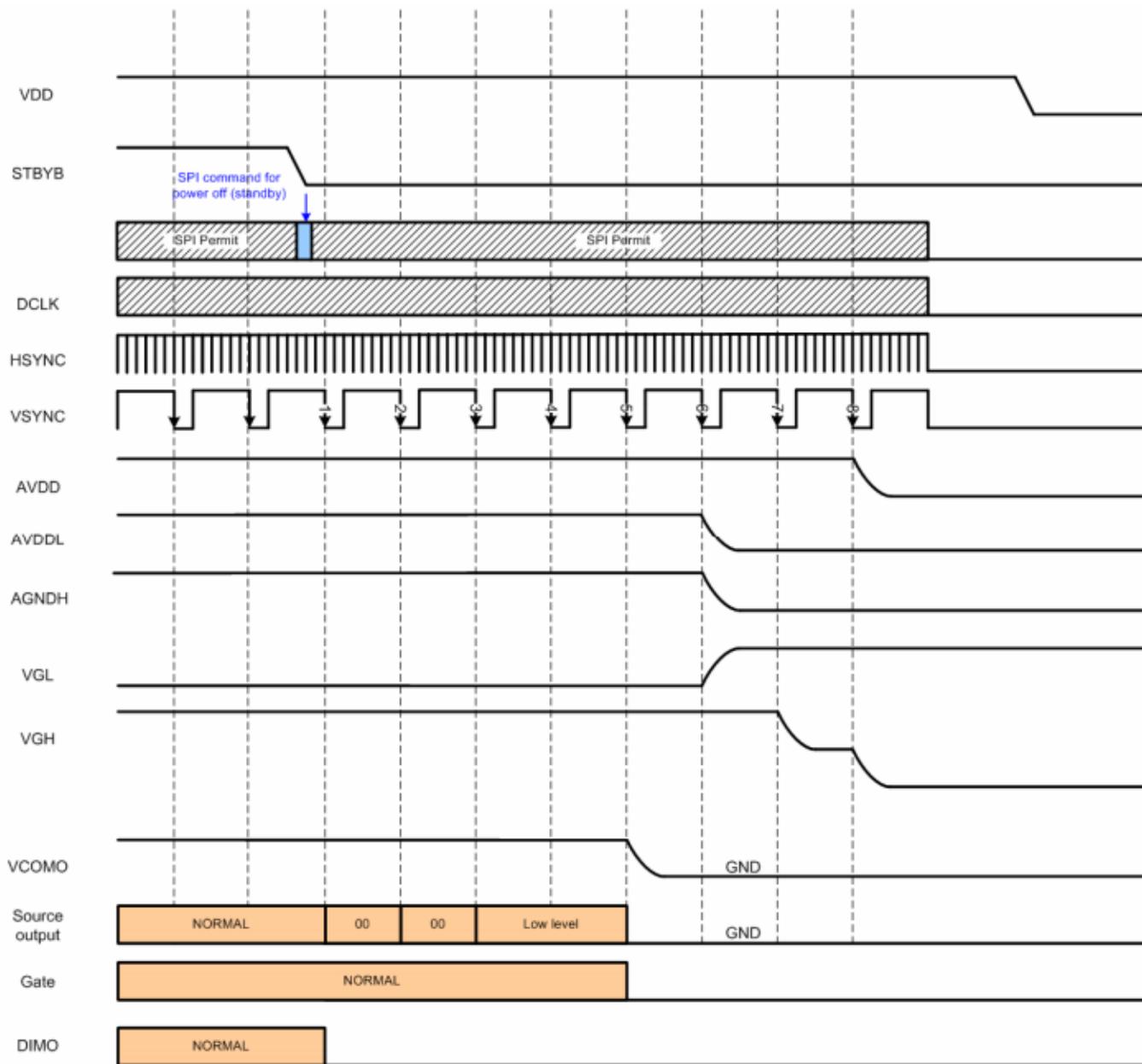
Power off timing sequence

7.2 INPUT SIGNAL TIMING

7.2.1 DC electrical characteristics

TTL mode DC electrical characteristics

(VDD=2.3 to 3.6V, AVDD=6.5 to 13.5V, GND=AGND=0V, T_A=-20℃ to +85℃)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Power supply voltage	VDD	-	2.3	-	3.6	V
Power supply voltage	AVDD	-	6.5	-	13.5	V
Power supply voltage	AVDDL	Full range application	6.5	-	13.5	V
		Half AVDD application	-	V8+0.1	-	V
Power supply voltage	AGNDH	Full range application	0			V
		Half AVDD application	-	V7-0.1	-	V
Low level input voltage	V_{IL}	For digital circuit	0	-	0.3VDD	V
High level input voltage	V_{IH}	For digital circuit	0.7VDD	-	VDD	V
Output low voltage	V_{OL}	I_{OL}=400µA	-	-	GND+0.4	V
Output high voltage	V_{OH}	I_{OH}=-400µA	VDD-0.4	-	-	V
Pull low/high resistance	R_i	For the digital input pin @VDD=3.3V	200	250	300	KΩ
Input leakage current	Ii	For digital circuit	-	-	±1	µA
Digital operation current	Idd	Fclk=50MHz, LD=48KHz,VDD=3.3V, No load	-	12	20	mA
Digital stand-by current	Ist1	Clock & all functions are stopped	-	10	50	µA
Analog operating current	Idda	No load, Fclk=50MHz,LD=48KHz @ AVDD=10V, V1=8V, V14=0.4V	-	8	10	mA
Analog stand-by current	Ist2	No load, clock & all functions are stopped	-	10	50	µA
Input level of V1~V7	Vref1	Gamma correction voltage input	0.4AVDD	-	AVDD-0.1	V
Input level of V8~V14	Vref2	Gamma correction voltage input	0.1	-	0.6AVDD	V
Output voltage deviation	Vod1	Vo=AGND+0.1V~AGND+0.5V & Vo=AVDD-0.5V~AVDD-0.1V	-	±20	±35	mV
Output voltage deviation	Vod2	Vo=AGND+0.5V~AVDD-0.5V	-	±15	±20	mV
Output voltage offset between chips	Voc	Vo=AGND+0.5V~AVDD-0.5V	-	-	±20	mV
Dynamic range of output	Vdr	SO1~SO1200	0.1	-	AVDD-0.1	V
Sinking current of outputs	IOLy	SO1~SO1200; Vo=0.1V vs. 1.0V, AVDD=13.5V	80	-	-	µA
Driving current of outputs	IOHy	SO1~SO1200 ;Vo=0.1V vs. 12.5V, AVDD=13.5V	80	-	-	µA
Resistance of gamma table	Rg	Rn: Internal gamma resistor	0.7xRn	1.0xRn	1.3xRn	Ω

7.2.2AC ELECTRICAL CHARACTERISTICS

TTL mode AC electrical characteristics

Parameter	Symbol	Condition	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
VDD power on slew rate	T_{POR}	From 0V to 90% VDD	-	-	20	ms
GRB pulse width	T_{GRB}	-	50	-	-	μs
DCLK cycle time	T_{cph}	-	14	-	-	ns
DCLK pulse duty	T_{cwh}	-	40	50	60	%
VSD setup time	T_{vst}	-	5	-	-	ns
VSD hold time	T_{vhd}	-	5	-	-	ns
HSD setup time	T_{hst}	-	5	-	-	ns
HSD hold time	T_{hhd}	-	5	-	-	ns
Data setup time	T_{dsu}	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	T_{dhd}	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	T_{esu}	-	5	-	-	ns
DE hold time	T_{ehd}	-	5	-	-	ns
Output stable time	T_{sst}	10% to 90% target voltage. CL=90pF, R=10KΩ (Cascade)	-	-	6	μs
		Dual gate			3	

7.3 PARALLEL RGB INPUT TIMING TABLE

DE mode (1024x600)

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
DCLK frequency	fclk	40.8	51.2	67.2	MHz
Horizontal display area	thd		1024		DCLK
HSD period	th	1114	1344	1400	DCLK
HSD blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		T_H
VSD period	tv	610	635	800	T_H
VSD blanking	tvbp+tvfp	10	35	200	T_H

7.4 TIMING DIAGRAM

Input Clock and Data Timing Diagram
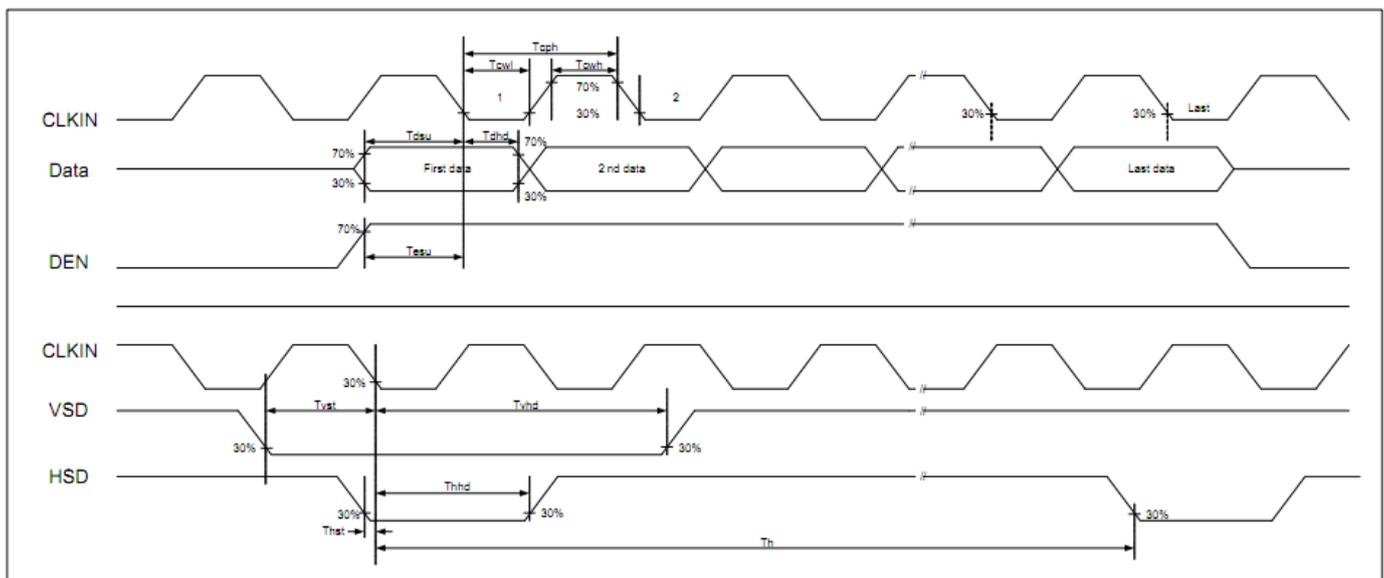
8. Backlight Characteristic
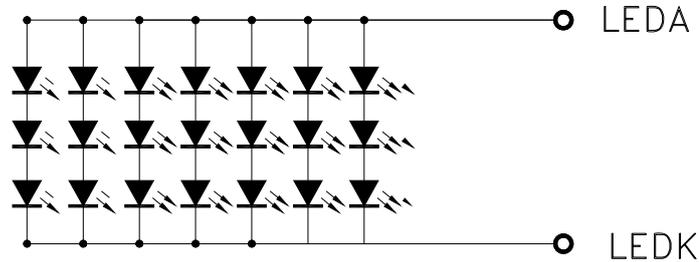
Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	8.4	9.0	10.2	V	If=140mA
Supply Current	If	-	140	-	mA	-
Luminous Intensity for LCM	-	400	450	-	cd/m^2	If=140mA
Uniformity for LCM	-	80	-	-	％	If=140mA
Life Time	-	20000	-	-	Hr	If=140mA
Backlight Color	White					

Note 1: Each LED : IF =20 mA, VF =3V.

Note 2: Optical performance should be evaluated at Ta=25℃ only.

Note 3: 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.

深圳市勋瑞光电科技有限公司
Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θL	-	80	-	degree	(1),(2),(6)
		θR	-	80	-		
	Vertical	θT	-	80	-		
		θB	-	80	-		
Contrast Ratio	Center		800	1000	-		(1),(3),(6)
Response Time	Rising		-	25	35	ms	(1),(4),(6)
	Falling						
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.05	0.632	Typ. +0.05	-	(1), (6)
	Red y			0.314		-	
	Green x			0.272		-	
	Green y			0.561		-	
	Blue x			0.136		-	
	Blue y			0.100		-	
	White x			0.304		-	
	White y			0.344		-	

Note (1) Measurement Setup: The LCD module should be stabilized at given temp. 25°C for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.

Photo-detector (BM-5A)

50cm

Field=1°

Center of panel

LCD panel
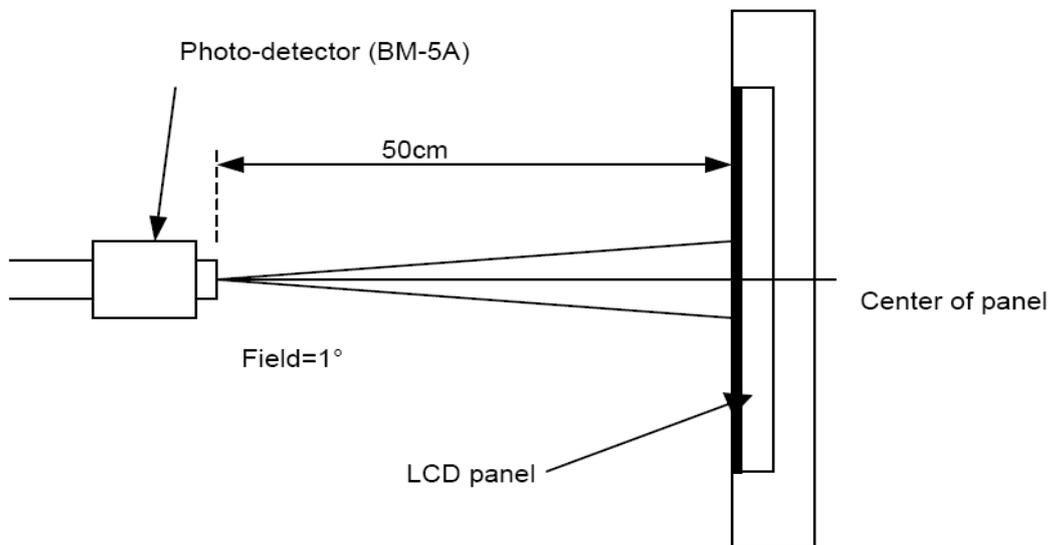
Note (2) Definition of Viewing Angle
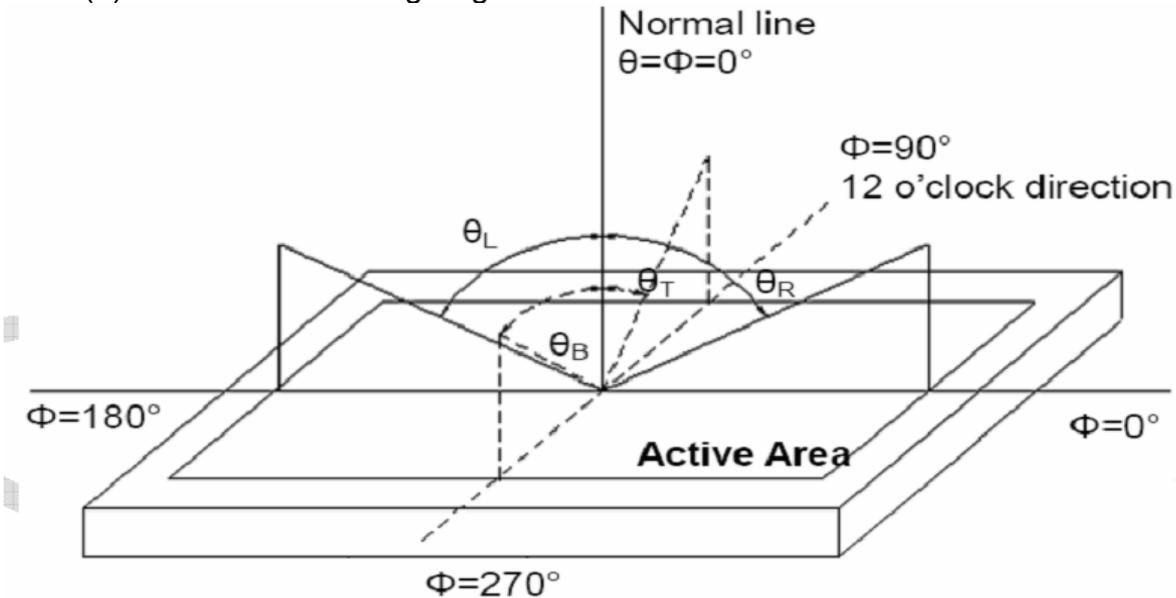
Note (3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note (4) Definition of response time
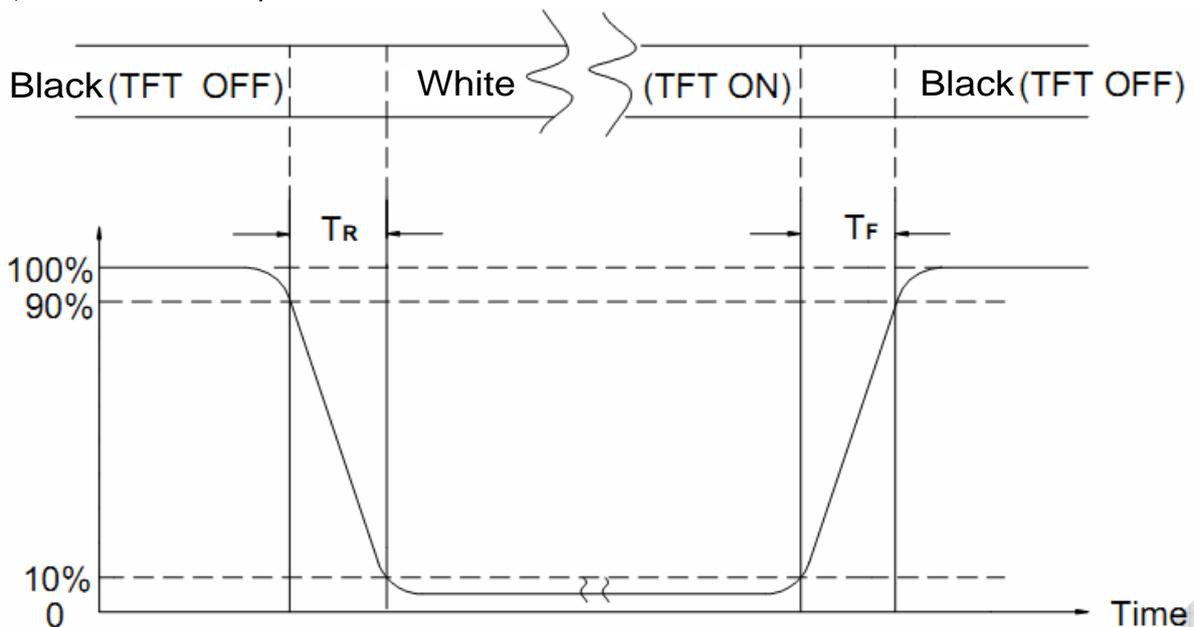
Note (5) Definition of Transmittance (Module is without signal input)

Transmittance = Center Luminance of LCD / Center Luminance of Back Light x 100%

Note (6) Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD

深圳市勋瑞光电科技有限公司
Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

10. Reliability Test Conditions and Methods11. Inspection Standard

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	80°C±5°C×96Hours	
②	Low Temperature Storage	-30°C±5°C×96Hours	
③	High Temperature Operating	70°C±5°C×96Hours	
④	Low Temperature Operating	-20°C±5°C×96Hours	
⑤	Temperature Cycle(Storage)	-30°C ⟷ 25°C ⟷ 80°C (30min) (5min) (30min) 1cycle Total 10cycle	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
⑥	Damp Proof Test (Storage)	50°C±5°C×90%RH×96Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (packing condition test will be tested by a carton)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (packing condition test will be tested by a carton)	
⑨	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK:
1, The Test samples should be applied to only one test item.
2, Sample side for each test item is 5~10pcs.
3,For Damp Proof Test, Pure water(Resistance＞10MΩ)should be used.
4,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.
5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

11.1. QUALITY :

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

11.1.1. INSPECTIONTOOLS AND INSTRUMENTS

Vernier calipers, film scales, multimeter, magnifying eyepiece, ND5%, luminance meter and so on.

11.1.2. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM YUXIANG TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10 TO 40 ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

11.1.3. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION , A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (SAME AS MIL-STD-105E) ,LEVEL:II

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

11.1.4. WARRANTY POLICY

YUXIANG WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. YUXIANG WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF YUXIANG.

11.2. CHECKING CONDITION

11.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.

11.2.2. CHECKER SHALL SEE OVER 300±25 mm. WITH BARE EYES FAR FROM SAMPLE

11.2.3. Ambient Illumination:

0 ~30 Lux for functional inspection

500 ~ 1200 Lux for external appearance inspection.

11.2.4. TEST AREA：
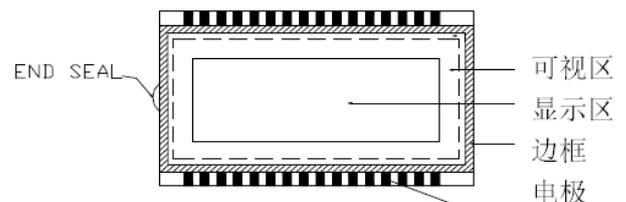
11.2.5. Inspection should be carried out with rope electrostatic ring and static finger cover (both hands except small fingers must be worn)

11.2.6. The inspector may make a visual inspection or a comparative examination with a film

ruler and a magnifying eyepiece. Individual defects shall be determined according to the limited samples.

11.2.7. Functional testing uses electrical testing fixtures or test fixtures required by customers.

11.2.8. the ion fan should be used when testing.

11.2.9. the principle of judgment

11.3.1 If the defect outside the visual area does not affect the assembly and display, it will be judged as a good product.

11.3.2 Poor definition

Pixel:

A combination of three sub-pixels (Red + Green + Blue).
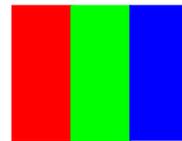
Dot:

Any of the sub-pixels (Red or Green or Blue).

Bright and dark dots:

A point pixel (sub-pixel: R, G, B pixels) is lit or turned off during the display function test.

Highlights:

Usually considered to be shown on a black screen.

Dark spots:

They are generally considered to be shown on R, G, B solid colors or white images.

Neighborhood:

Two or three adjacent point pixels (dot: sub-pixel) connected together (R, G or G, B or B, R or RGB).

11.3. INSPECTION PLAN :

CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED...............REJECTED QUANTITY SHORT OR OVER......REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREA ....REJECTED	Minor
	6. BLEMISH、BLACK SPOT、WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	7. BLEMISH、BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD......REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST、VOP、 CHROMATICITY ... ETC)	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT、LINE、CHARACTER ....REJECTED	Critical
	12.SHORT CIRCUIT、 WRONG PATTERN DISPLAY	NO DISPLAY、WRONG PATTERN DISPLAY、CURRENT CONSUMPTION OUT OF SPECIFICATION...... REJECTED	Critical
	13. DOT DEFECT (FOR COLOR AND TFT)	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

NO.	CLASS	ITEM	JUDGEMENT
11.4.1	MINOR	BLACK AND WHITE SPOT FOREIGN MATERIEL DUST IN THE CELL BLEMISH SCRATCH	(A) ROUND TYPE: unit : mm.
11.4.2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	unit : mm.
11.4.3	MINOR	Dot Defect	
11.4.4	MINOR	Mura	Not visible thrirugh 5% ND filter in 50% gray or judge by limit sample if necessary

11.4.1 (A) ROUND TYPE: unit : mm.

DIAMETER (mm.)	ACCEPTABLE Q'TY
Φ ≦ 0.15	Distance≥1mm
0.15 < Φ ≦ 0.4	3 (Distance>15mm)
0.4 < Φ	0

NOTE: Φ=(LENGTH+WIDTH)/2

(B) LINEAR TYPE: unit : mm.

LENGTH	WIDTH	ACCEPTABLE Q'TY
------	W ≦0.03	Distance≥1mm
L ≦ 4.0	0.03 < W ≦0.05	3 (Distance>15mm)
------	0.05 < W	FOLLOW ROUND TYPE

11.4.2 unit : mm.

DIAMETER	ACCEPTABLE Q'TY
Φ ≦ 0.2	Distance≥1mm
0.2 < Φ ≦ 0.5	3 (Distance>15mm)
0.5 < Φ	0

11.4.3

Items	ACC. Q'TY
Bright dot	N≦2 (Distance>15mm)
Dark dot	N≦3 (Distance>15mm)

Pixel Define :

Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Definittion:<1/2dot and visible by 5% ND filter N≦5

Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.

NO.	CLASS	ITEM	JUDGEMENT	
11.4.4	MINOR	LCD GLASS CHIPPING	$Y > S$	Reject
11.4.5	MINOR	LCD GLASS CHIPPING	X or $Y > S$	Reject
11.4.6	MAJOR	LCD GLASS GLASS CRACK	$Y > (1/2) T$	Reject
11.4.7	MAJOR	LCD GLASS SCRIBE DEFECT	1. $a > L/3$, $A > 1.5mm$. Reject 2. B：ACCORDING TO DIMENSION	
11.4.8	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)	$\Phi = (x+y)/2 > 2.5$ mm	Reject
11.4.9	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL SURFACE)	$Y > (1/3) T$	Reject
11.4.10	MINOR	LCD GLASS CHIPPING	$Y > T$	Reject
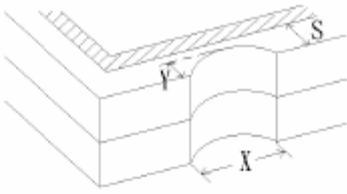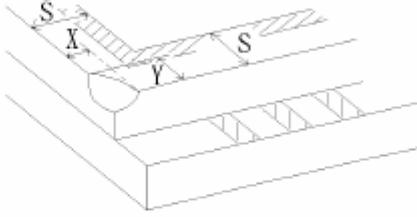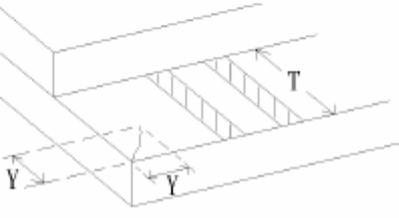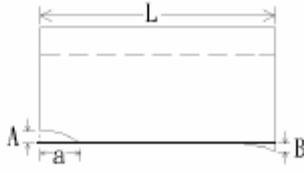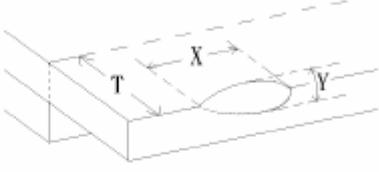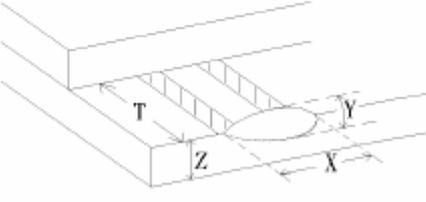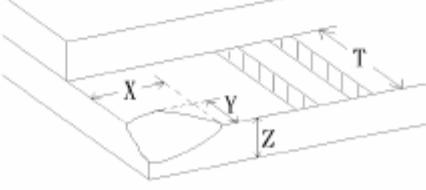
12. Handling Precautions

12.1 Mounting method

The LCD panel of YUXIANG TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent
[Recommended below] and wipe lightly
- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:
- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated:
- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to POWER or GROUND, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.
  [It is recommended to store them as they have been contained in the inner container at the time of delivery from us

12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to YUXIANG TFT , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

14. Packing Method

TBD