



深圳市勋瑞光电科技有限公司
Xunrui photoelectric technology (shenzhen) CO.,LTD.

Product Specification

Customer: _____

Model Name: H101IWS50E 3501-T1

Date: 2023-03-01

Version: A0

☒ Preliminary Specification

☐ Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

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1. Scope

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

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

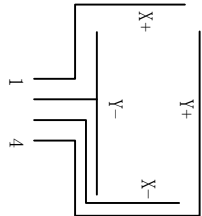
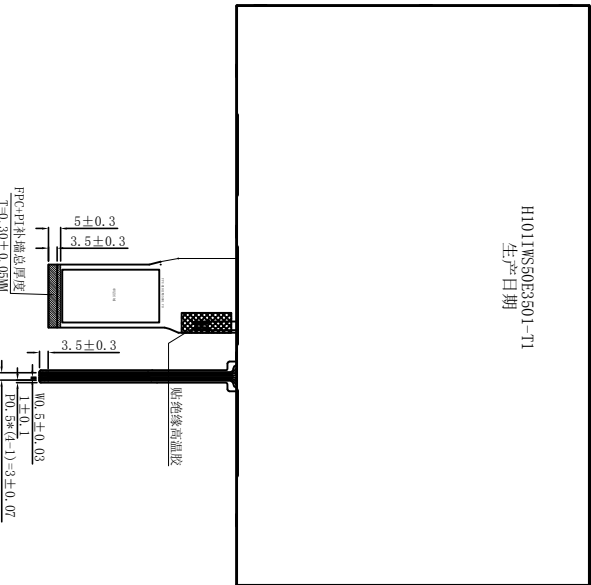
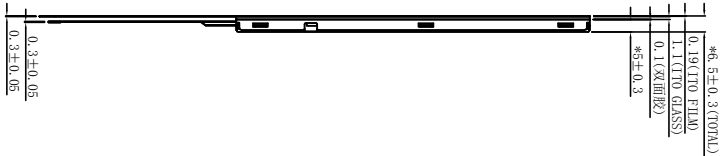
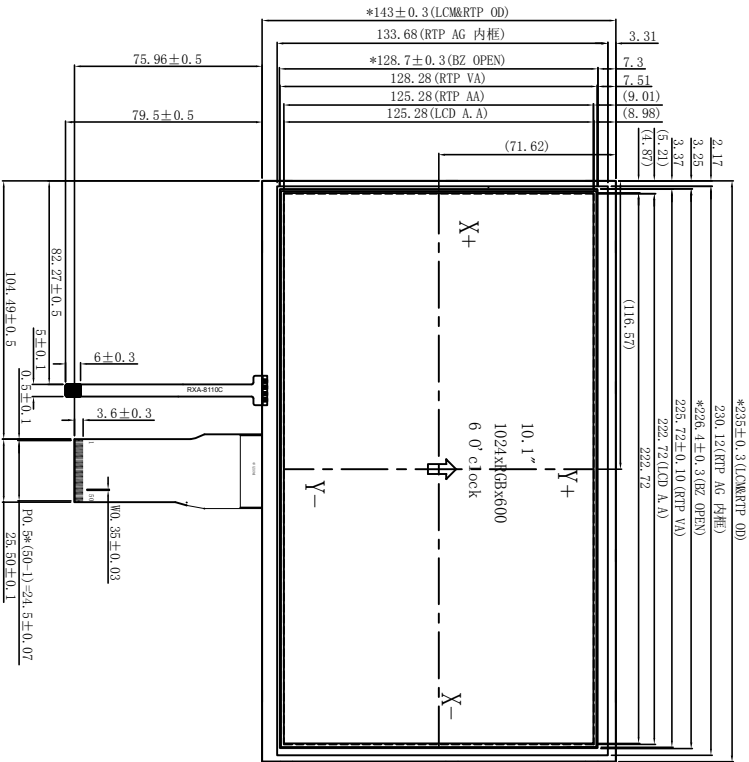
2. General Information

ITEM	STANDARD VALUES	UNITS
LCD type	10.1" TFT	--
Dot arrangement	1024×3 (RGB)×600	dots
Color filter array	RGB vertical stripe	--
Display mode	Normally White	--
Viewing Direction	6 O' Clock	--
Module size(LCM+CTP)	235 (W)×143(H)×6.5(T)	mm
Active area	222.72(W)×125.28(H)	mm
Dot pitch	0.2175(W)×0.2088(H)	mm
Interface	RGB Interface	--
Operating temperature	-10 ~ +60	°C
Storage temperature	-20 ~ +70	°C
Module Weight	--	g

3. External Dimensions

REV.	DATE	MODIFICATION
A0	2023.03.01	First Issue

PIN ASSIGNMENT	
1	LEDA
2	LEDB
3	LEFC
4	LEBK
5	GND
6	VCOM
7	DVID
8	MORE
9	DE
10	VS
11	BS
12	B7
13	B6
14	B5
15	B4
16	B3
17	B2
18	B1
19	B0
20	G7
21	G6
22	G5
23	G4
24	G3
25	G2
26	G1
27	G0
28	R7
29	R6
30	R5
31	R4
32	R3
33	R2
34	R1
35	R0
36	GND
37	CLK
38	GND
39	L/R
40	L/D
41	WGL
42	WGL
43	ADDB
44	RESET
45	NC
46	VCOM
47	DTHB
48	GND
49	NC
50	NC



CIRCUIT DIAGRAM	
VF: 8.7V~10.2V, IF: 220mA	

- NOTES:
1. DISPLAY TYPE: 10.1 INCH TFT /WHITE
 2. BACKLIGHT: 33 CHIP WHITE LED, IN PARALLEL
 3. OPERATING TEMP: -10° C~+60° C
 4. STORAGE TEMP: -20° C~+70° C
 5. RESOLUTION: 1024xRGBx600
 6. LCD IC: Source IC: EK79001HM+Gate IC: EK73215BCGA
 7. Luminous Instensity (9 AVG): 230cd/m² (MIN), 260cd/m² (TYP)
 8. " () " reference dimension. " * " critical dimension
 9. RoHS Compliant

- RTP技术说明:
1. 结构: f1lm+glass+FPC
 2. 工作电压: 5.0V
 3. 电路等级: DC5V 1mA
 4. 绝缘阻抗: ≥20MΩ (25V DC)
 5. 线性: ≤1.5%
 6. 透光率: ≥76%
 7. 操作压力: 50~120g
 8. 使用寿命: ≥1,000,000次
 9. 工作环境: -10°C~+60°C, ≤90%RH
 10. 储存环境: -20°C~+70°C, ≤90%RH
 11. 未注尺寸公差按±0.50

INTERFACE		RGB Interface	
FPC Connector			
VIEWING DIRECTION		6 0° clock	
Gray Scale		12 0° clock	
PROJECTION		3RD ANGLE	
SHEET OR		1/1	
TOLERANCE UNLESS SPECIFIED		±0.3	
SCALE		1:1	

深圳市翊瑞光电科技有限公司

MODEL NAME: H101WS50E3501-T1

REV. A0

SHEET OR 1/1

TOLERANCE UNLESS SPECIFIED ±0.3

SCALE 1:1



4. Interface Description

No.	Symbol	I/O	Function
1~2	LEDA	P	LED Anode
3~4	LEDK	P	LED Cathode
5	GND	P	Ground
6	VCOM	P	Common voltage
7	DVDD	P	Digital power
8	MODE	I	DE/SYNC mode select MODE=H: DE mode(normally pull high) MODE=L: HSD/VSD mode
9	DE	I	Data enable signal
10	VS	I	Vertical sync input.Negative polarity
11	HS	I	Horizontal sync input.Negative polarity
12~19	B7~B0	I	Blue data Input
20~27	G7~G0	I	Green data Input
28~35	R7~R0	I	Red data Input
36	GND	P	Ground
37	DCLK	I	Clock input
38	GND	P	Ground
39	L/R	I	Source right or left sequence control SHLR=H: right shift, Left → Right(Default) SHLR=L: left right, Right → Left
40	U/D	I	Gate up or down scan control UPDN=H: up shift, Down → Up UPDN=L: down shift, Up → Down(Default)
41	VGH	P	Positive power for TFT
42	VGL	P	Negative power for TFT
43	AVDD	P	Power for Analog Circuit
44	RESET	I	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10K , C=1μF)
45	NC	-	Not connect
46	VCOM	P	Common voltage
47	DITHB	I	Dithering function
48	GND	P	Ground
49~50	NC	-	Not connect

I : input , O : output , P : Power



5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	DVDD	-0.5	5.0	V
Analog Supply Voltage	AVDD	-0.5	15.0	V
Gate On Voltage	VGH	-0.3	40.0	V
Gate Off Voltage	VGL	-20.0	0.3	V
Gate On- Gate Off Voltage	VGH-VGL	-	40.0	V
Operating Temperature	T _{OP}	-20	70	°C
Storage Temperature	T _{ST}	-30	80	°C
Storage Humidity	HD	20	90	%RH

6. DC Characteristics

Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Digital Supply Voltage	DVDD	2.3	3.3	3.6	V	-
Analog Supply Voltage	AVDD	8.0	9.7	13.5	V	-
Gate On Voltage	VGH	-	25.0	-	V	-
Gate Off Voltage	VGL	-	-7	-	V	-
Common Voltage	VCOM	3.3	3.65	4.1	V	-
Logic Input Voltage	VIH	0.7DVDD	-	DVDD	V	-
	VIL	GND	-	0.3DVDD	V	-

NOTE1: **VCOM** 电压根据客户主板实际效果而定



7. Timing Characteristics

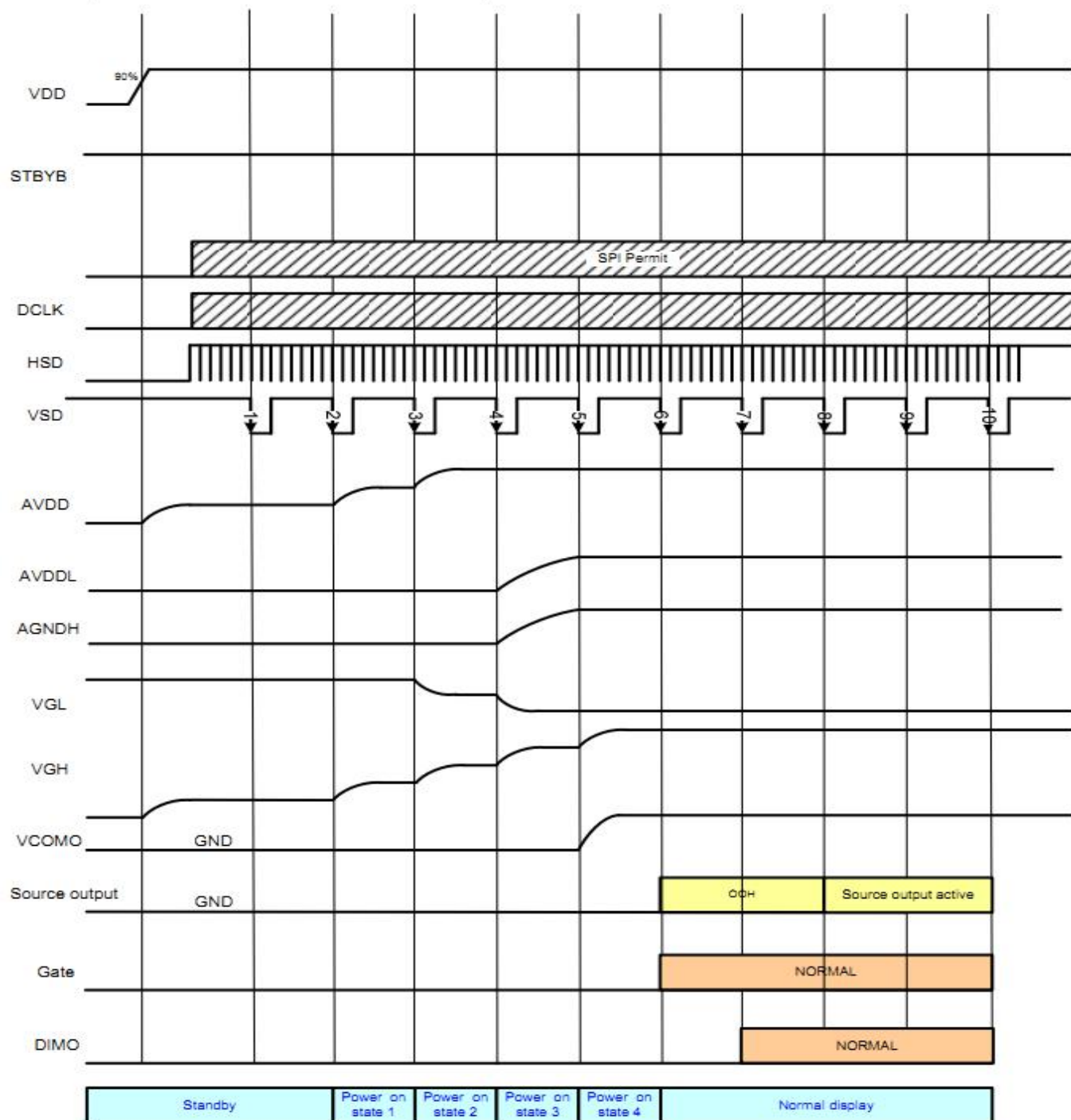
7.1 POWER ON/OFF SEQUENCE

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

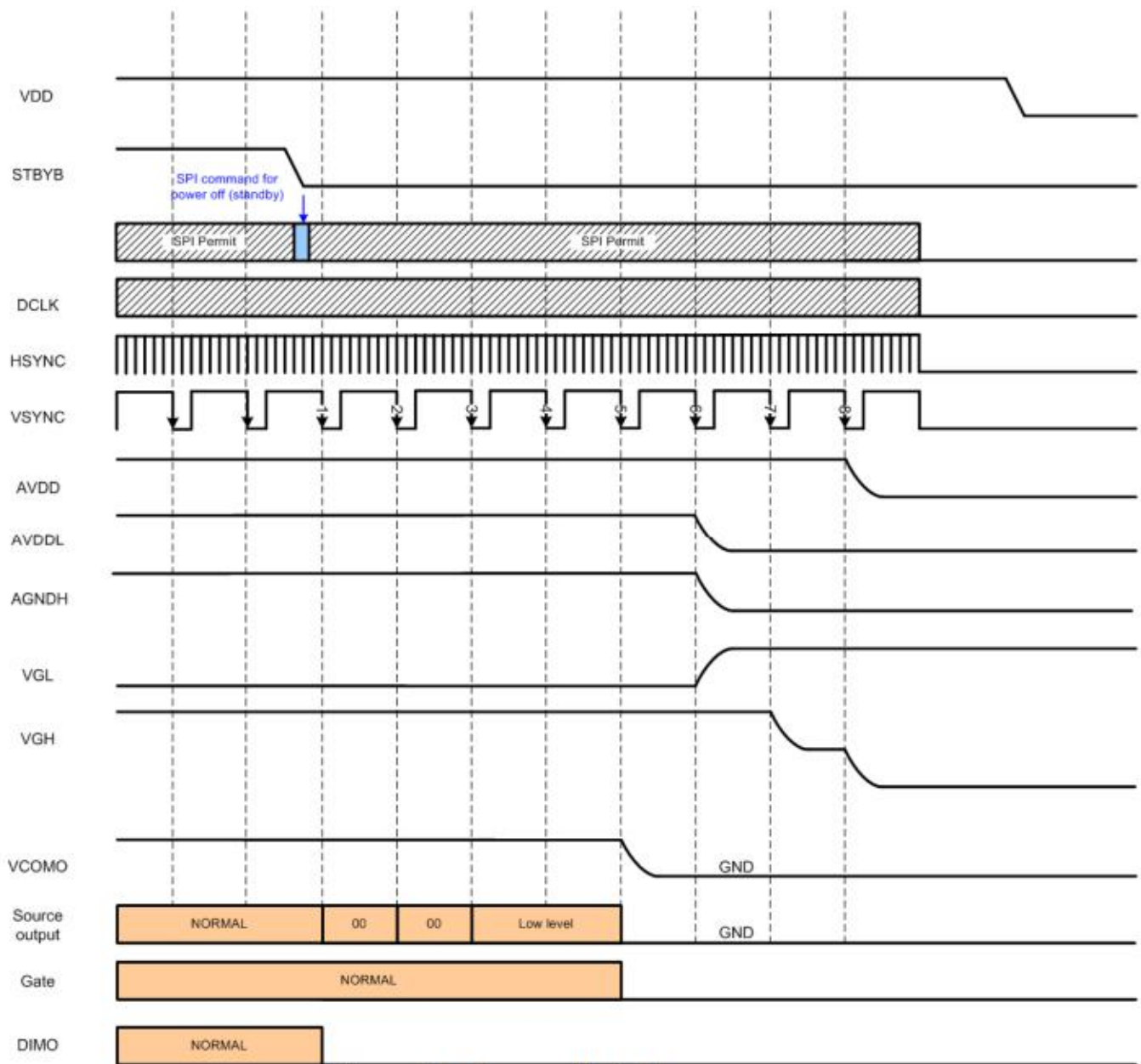
Power on: VDD, GND _ AVDD, AGND _ V1 to V14

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Low level input voltage	Vil	For the digital circuit	0	-	0.3×VDD	V
High level input voltage	Vih	For the digital circuit	0.7×VDD	-	VDD	V
Input leakage current	Ii	For the digital circuit	-	-	±1	μA
High level output voltage	Voh	Ioh= -400 μA	VDD-0.4	-	-	V
Low level output voltage	Vol	Iol= +400 μA	-	-	GND+0.4	V
Pull low/high resistor	Ri	For the digital input pin @ VDD=3.3V	200K	250K	300K	ohm
Digital Operation current	Idd	Fclk=65 MHz, FLD=50KHz, VDD=3.3V	-	15	25	mA
Digital Stand-by current	Ist1	Clock and all functions are stopped	-	10	50	μA
Analog Operating Current	Idda	No load, Fclk=65MHz, FLD=50KHz @ AVDD=10V, V1=8V, V14=0.4V	-	10	12	mA
Analog Stand-by current	Ist2	No load, Clock and all functions are Stopped	-	10	50	μA
Input level of V1 ~ V7	Vref1	Gamma correction voltage input	0.4×AVDD	-	AVDD-0.1	V
Input level of V8 ~ V14	Vref2	Gamma correction voltage input	0.1	-	0.6×AVDD	V
Output Voltage deviation	Vod1	Vo = AVSS+0.1V ~ AVSS+0.5V and Vo = AVDD-0.5V ~ AVDD-0.1V	-	±20	±35	mV
Output Voltage deviation	Vod2	Vo = AVSS+0.5V ~ AVDD-0.5V	-	±15	±20	mV
Output Voltage Offset between Chips	Voc	Vo = AVSS+0.5V ~ AVDD-0.5V	-	-	±20	mV
Dynamic Range of Output	Vdr	SO1 ~ SO1536	0.1	-	AVDD-0.1	V
Sinking Current of Outputs	IOLy	SO1 ~ SO1536; Vo=0.1V v.s 1.0V , AVDD=13.5V	80	-	-	uA
Driving Current of Outputs	IOHy	SO1 ~ SO1536; Vo=13.4V v.s 12.5V , AVDD=13.5V	80	-	-	uA
Resistance of Gamma Table	Rg	Rn: Internal gamma resistor	0.7×Rn	1.0×Rn	1.3×Rn	ohm



7.2.2AC ELECTRICAL CHARACTERISTICS

TTL mode AC electrical characteristics

TTL mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	1	-	20	ms
RST pulse width	TRST	DCLK = 65MHz	50	-	-	us
DCLK cycle time	Tcph	-	14	-	-	ns
DCLK pulse duty	Towh	-	40	50	60	%
VSD setup time	Tvst	-	5	-	-	ns
VSD hold time	Tvhd	-	5	-	-	ns
HSD setup time	Thst	-	5	-	-	ns
HSD hold time	Thhd	-	5	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	Tesu	-	5	-	-	ns
DE hold time	Tehd	-	5	-	-	ns
Output stable time	Tsst	Dual gate	-	-	3	us

7.2.3TTL mode data input format

Vertical timing

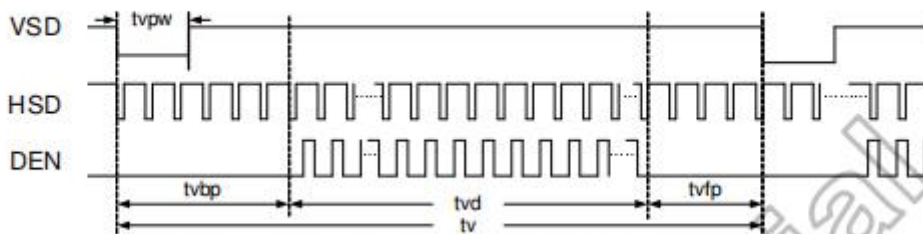
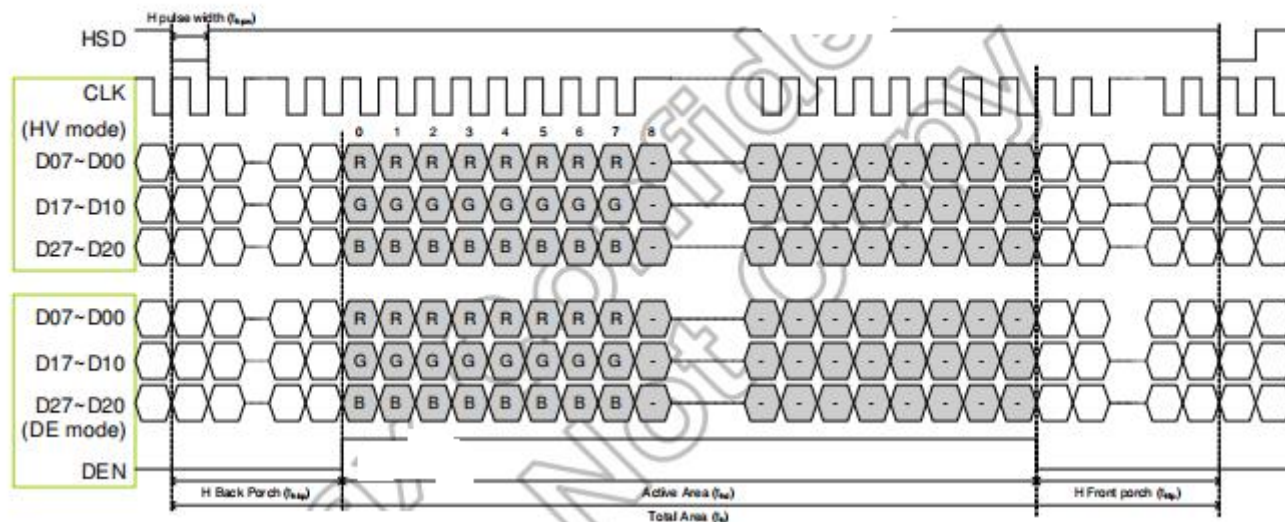


Figure 10.2: Vertical input timing diagram

Horizontal timing





7.3 PARALLEL RGB INPUT TIMING TABLE

Resolution:1024x600

DE mode

DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode

Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	Mhz
			44.9	51.2	63	
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

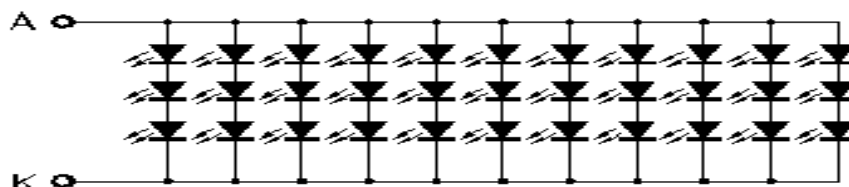
HV mode(2)

Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H





8. Backlight Characteristics



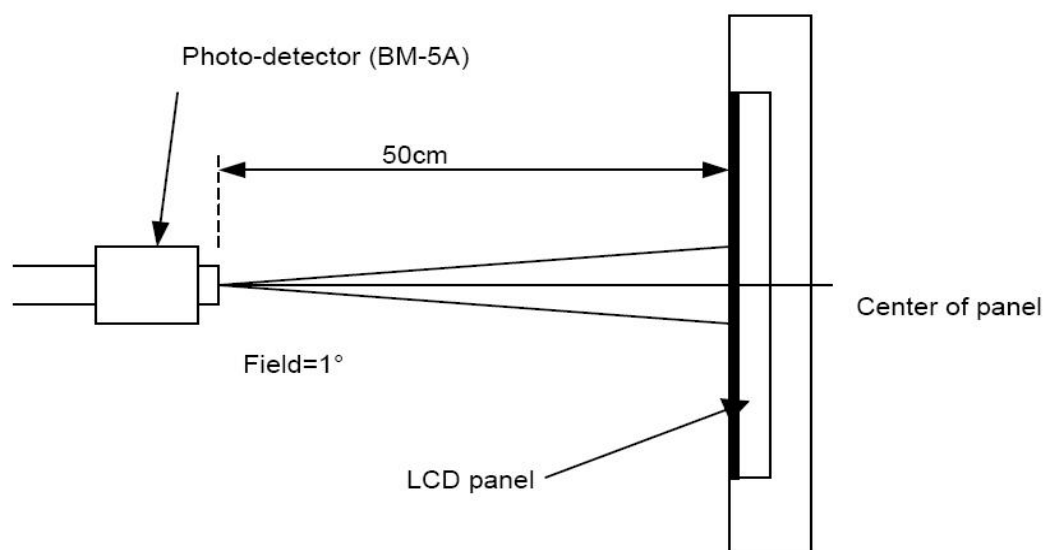
CIRCUIT DIAGRAM
VF: 8.7V~10.2V, IF: 220mA

Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	8.7	9.6	10.2	V	If=220mA
Supply Current	If	-	220	-	mA	If=220mA
Luminous Intensity for LCM+CTP	-	230	260	-	cd/m ²	If=220mA
Uniformity for LCM	-	70	75	-	%	If=220mA
Life Time	-	20000	-	-	Hr	If=220mA

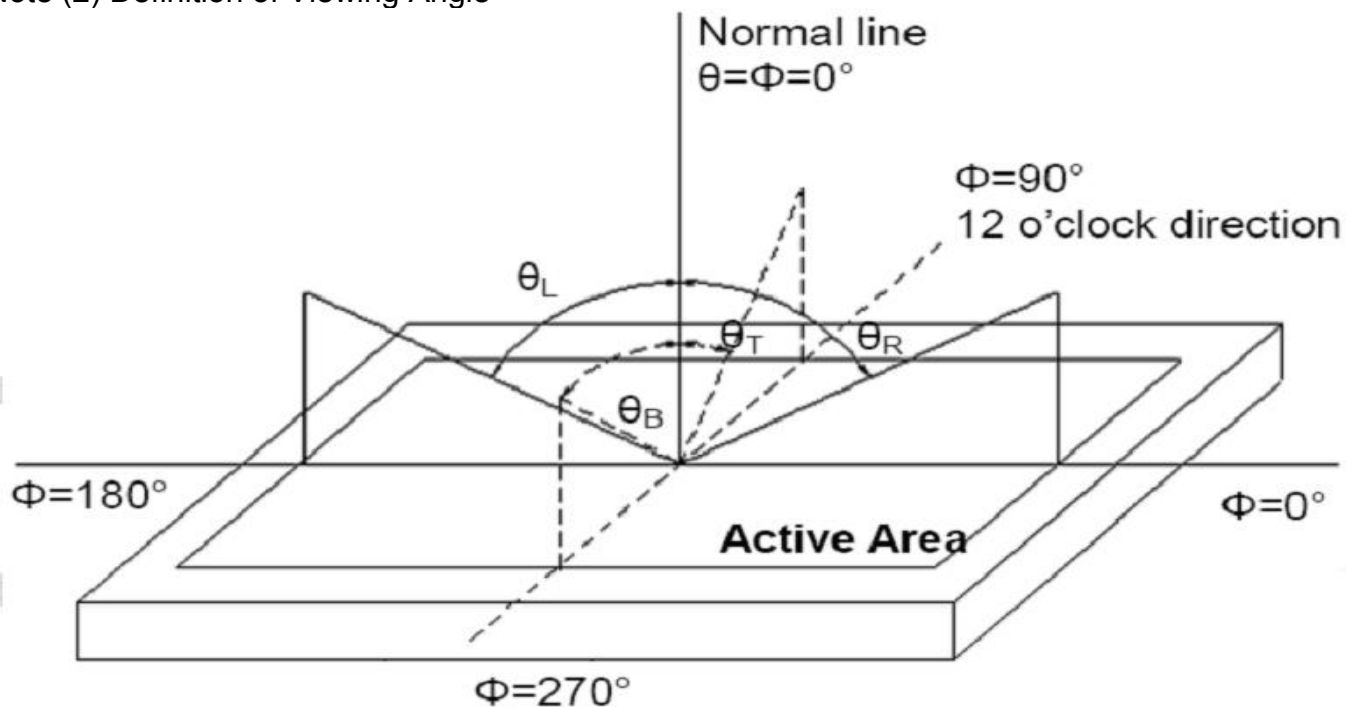
9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θ _L	75	80	-	degree	(1),(2),(6)
		θ _R	75	80	-		
	Vertical	θ _T	55	60	-		
		θ _B	65	70	-		
Contrast Ratio	Center		500	600	-	-	(1),(3),(6)
Transmittance	Tr		5.8	6.4		%	Base on BLU Light Note (7))
Response Time	Rising + Falling		-	25	40	ms	(1),(4),(6)
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.05	0.608	Typ. +0.05	-	(1), (6)
	Red y			0.330		-	
	Green x			0.298		-	
	Green y			0.562		-	
	Blue x			0.145		-	
	Blue y			0.163		-	
	White x			0.304		-	
	White y			0.339		-	

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.



Note (2) Definition of Viewing Angle



Note (3) Definition of Contrast Ratio (CR)

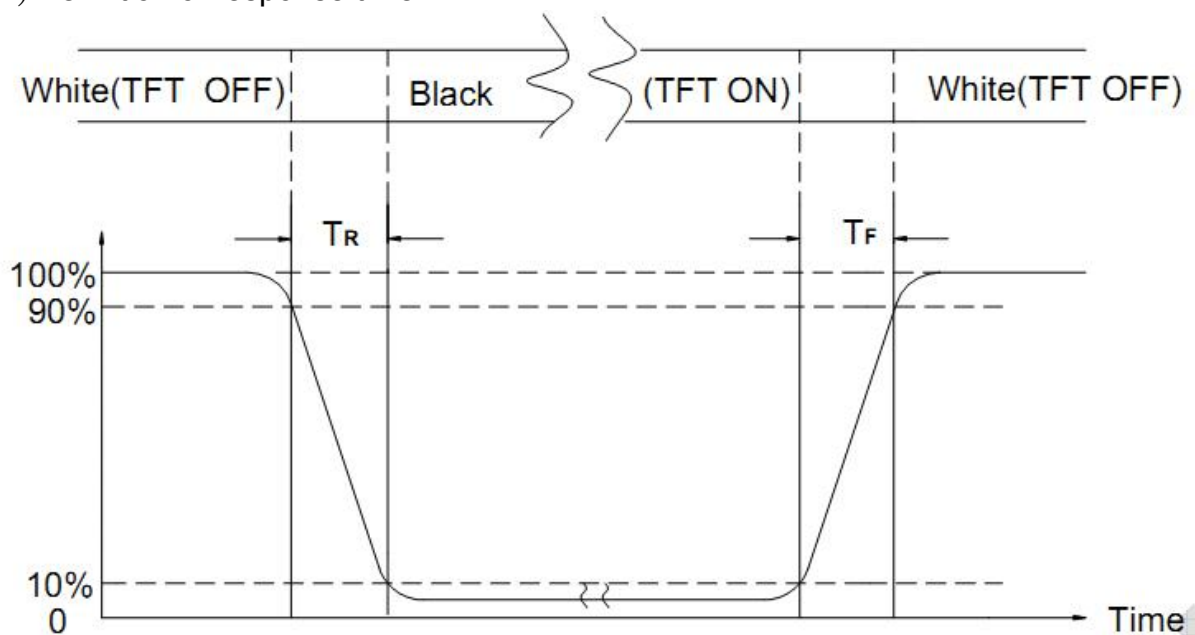
The contrast ratio can be calculated by the following expression

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

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



10. Reliability Test Conditions and Methods

NO.	TEST ITEMS	TEST CONDITION											
①	High Temperature Storage	Keep in 70℃ ±5℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
②	Low Temperature Storage	Keep in -20℃ ±5℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
③	High Temperature / High Humidity Storage Test	Keep in 60 ℃ / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)											
④	Temperature Cycling Storage Test	-20℃ → +15℃ → 70℃ → +25℃ (30mins) (5mins) (30mins) (5mins) 10 Cycle Surrounding temperature, then storage at normal condition 4hrs.											
⑤	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-										
		1. Temperature ambience : 15℃ ~ 35℃ 2. Humidity relative : 30% ~ 60% 3. Energy Storage Capacitance(Cs + Cd) : 150pF±10% 4. Discharge Resistance(Rd) : 330Ω±10% 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)											
⑥	Vibration Test (Packaged)	1. Sine wave 10 ~ 55 Hz frequency (1 min/sweep) 2. The amplitude of vibration : 1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs											
⑦	Drop Test (Packaged)	<table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> Drop Direction : ※ 1 corner / 3 edges / 6 sides each 1time		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
Packing Weight (Kg)	Drop Height (cm)												
0 ~ 45.4	122												
45.4 ~ 90.8	76												
90.8 ~ 454	61												
Over 454	46												



11. Inspection Standard

11.1. QUALITY :

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

11.1.1. INSPECTION TOOLS 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.

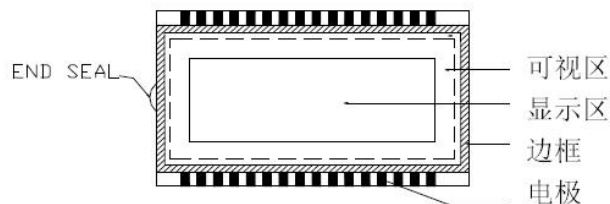
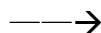
11.2.2. CHECKER SHALL SEE OVER 300±25 mm. WITH BARE EYES FAR FROM SAMPLE

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.

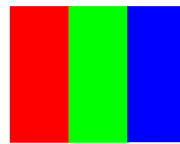
11.2.9. the principle of judgment

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).

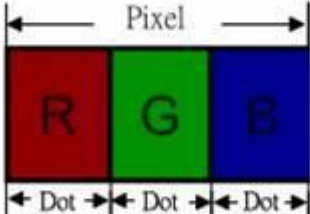


11.3. INSPECTION PLAN :

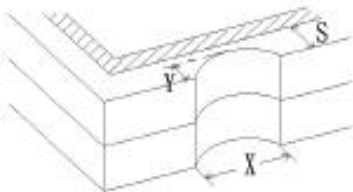
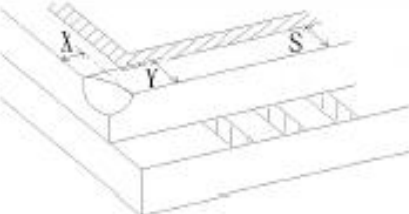
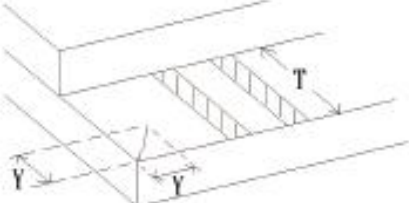
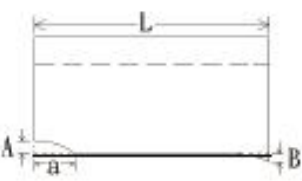
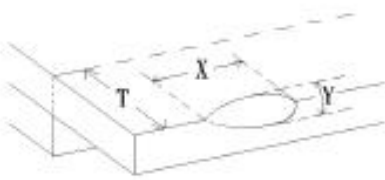
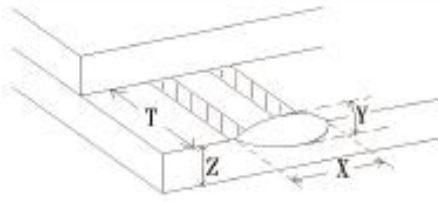
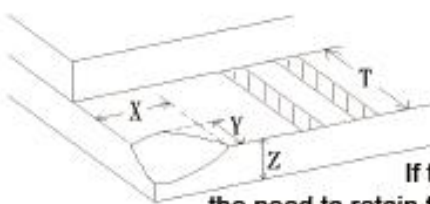
CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....REJECTED QUANTITY SHORT OR OVER.....REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE 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 AREAREJECTED	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 · CHARACTERREJECTED	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



11.4. STANDARD OF VISUAL INSPECTION

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. <table><tr><th>DIAMETER (mm.)</th><th>ACCEPTABLE Q'TY</th></tr><tr><td>$\Phi \leq 0.15$</td><td>Distance$\geq$1mm</td></tr><tr><td>$0.15 < \Phi \leq 0.4$</td><td>3 (Distance$>$15mm)</td></tr><tr><td>$0.4 < \Phi$</td><td>0</td></tr></table> NOTE: $\Phi=(\text{LENGTH}+\text{WIDTH})/2$ (B) LINEAR TYPE: unit : mm. <table><tr><th>LENGTH</th><th>WIDTH</th><th>ACCEPTABLE Q'TY</th></tr><tr><td>-----</td><td>$W \leq 0.03$</td><td>Distance$\geq$1mm</td></tr><tr><td>$L \leq 4.0$</td><td>$0.03 < W \leq 0.05$</td><td>3 (Distance$>$15mm)</td></tr><tr><td>-----</td><td>$0.05 < W$</td><td>FOLLOW ROUND TYPE</td></tr></table>	DIAMETER (mm.)	ACCEPTABLE Q'TY	$\Phi \leq 0.15$	Distance $\geq$ 1mm	$0.15 < \Phi \leq 0.4$	3 (Distance $>$ 15mm)	$0.4 < \Phi$	0	LENGTH	WIDTH	ACCEPTABLE Q'TY	-----	$W \leq 0.03$	Distance $\geq$ 1mm	$L \leq 4.0$	$0.03 < W \leq 0.05$	3 (Distance $>$ 15mm)	-----	$0.05 < W$	FOLLOW ROUND TYPE
DIAMETER (mm.)	ACCEPTABLE Q'TY																						
$\Phi \leq 0.15$	Distance $\geq$ 1mm																						
$0.15 < \Phi \leq 0.4$	3 (Distance $>$ 15mm)																						
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LENGTH	WIDTH	ACCEPTABLE Q'TY																					
-----	$W \leq 0.03$	Distance $\geq$ 1mm																					
$L \leq 4.0$	$0.03 < W \leq 0.05$	3 (Distance $>$ 15mm)																					
-----	$0.05 < W$	FOLLOW ROUND TYPE																					
11.4.2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	unit : mm. <table><tr><th>DIAMETER</th><th>ACCEPTABLE Q'TY</th></tr><tr><td>$\Phi \leq 0.2$</td><td>Distance$\geq$1mm</td></tr><tr><td>$0.2 < \Phi \leq 0.5$</td><td>3 (Distance$>$15mm)</td></tr><tr><td>$0.5 < \Phi$</td><td>0</td></tr></table>	DIAMETER	ACCEPTABLE Q'TY	$\Phi \leq 0.2$	Distance $\geq$ 1mm	$0.2 < \Phi \leq 0.5$	3 (Distance $>$ 15mm)	$0.5 < \Phi$	0												
DIAMETER	ACCEPTABLE Q'TY																						
$\Phi \leq 0.2$	Distance $\geq$ 1mm																						
$0.2 < \Phi \leq 0.5$	3 (Distance $>$ 15mm)																						
$0.5 < \Phi$	0																						
11.4.3	MINOR	Dot Defect	<table><tr><th>Items</th><th>ACC. Q'TY</th></tr><tr><td>Bright dot</td><td>$N \leq 2$ (Distance$\geq$15mm)</td></tr><tr><td>Dark dot</td><td>$N \leq 3$ (Distance$\geq$15mm)</td></tr></table> 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. Definitition:<1/2dot and visible by 5% ND filter $N \leq 5$ 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.	Items	ACC. Q'TY	Bright dot	$N \leq 2$ (Distance $\geq$ 15mm)	Dark dot	$N \leq 3$ (Distance $\geq$ 15mm)														
Items	ACC. Q'TY																						
Bright dot	$N \leq 2$ (Distance $\geq$ 15mm)																						
Dark dot	$N \leq 3$ (Distance $\geq$ 15mm)																						
11.4.4	MINOR	Mura	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary																				



NO.	CLASS	ITEM	JUDGEMENT
11.4.5	MINOR	LCD GLASS CHIPPING	 $X \geq 3\text{mm}$ $Y > S$ Reject
11.4.6	MINOR	LCD GLASS CHIPPING	 $X \text{ or } Y > S$ Reject
11.4.7	MAJOR	LCD GLASS GLASS CRACK	 Continuous burst NG Reject
11.4.8	MAJOR	LCD GLASS SCRIBE DEFECT	 L A B a ACCORDING TO DIMENSION
11.4.9	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)	 $Y < 1/2Z$ $Y \geq 0.5\text{mm}$ Reject $X \geq 3\text{mm}$
11.4.10	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL SURFACE)	 $Y < 1/2Z$ $Y \geq 0.5\text{mm}$ Reject $X \geq 3\text{mm}$
11.4.11	MINOR	LCD GLASS CHIPPING	 $X \geq 3\text{mm}$ $Y \geq T$ Reject If touch the electrode lines, the need to retain the two-thirds electrode lines



12. Handling Precautions

12.1 Mounting method

TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module is 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 happens 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 uses C-MOS LSI drivers, so we recommend 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 than the limit causes 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 than the operating temperature range and on the other hand at higher temperature LCD's show 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