宇华国际科技有限公司
YuHua INT,L Technology Co., LIMITED

Tel:0755-21010980 web:www.yhwdisplay.com

SPECIFICATION FOR LCD MODULE

Customer : _____

Product Model: YH101BS4003

Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

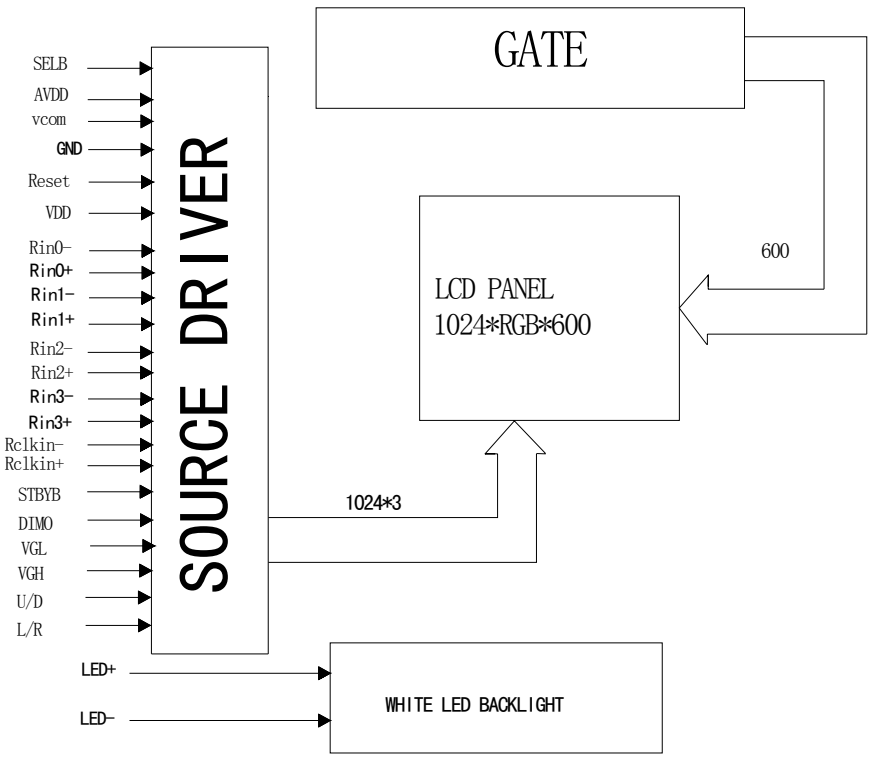
☐ **LCM Machinery OK** Checked By _____ ☐ **LCM Display OK** Checked By _____	☐ **LCM OK** ☐ **NG，Problem survey:** Approved By _____

※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

1. PHYSICAL DATA

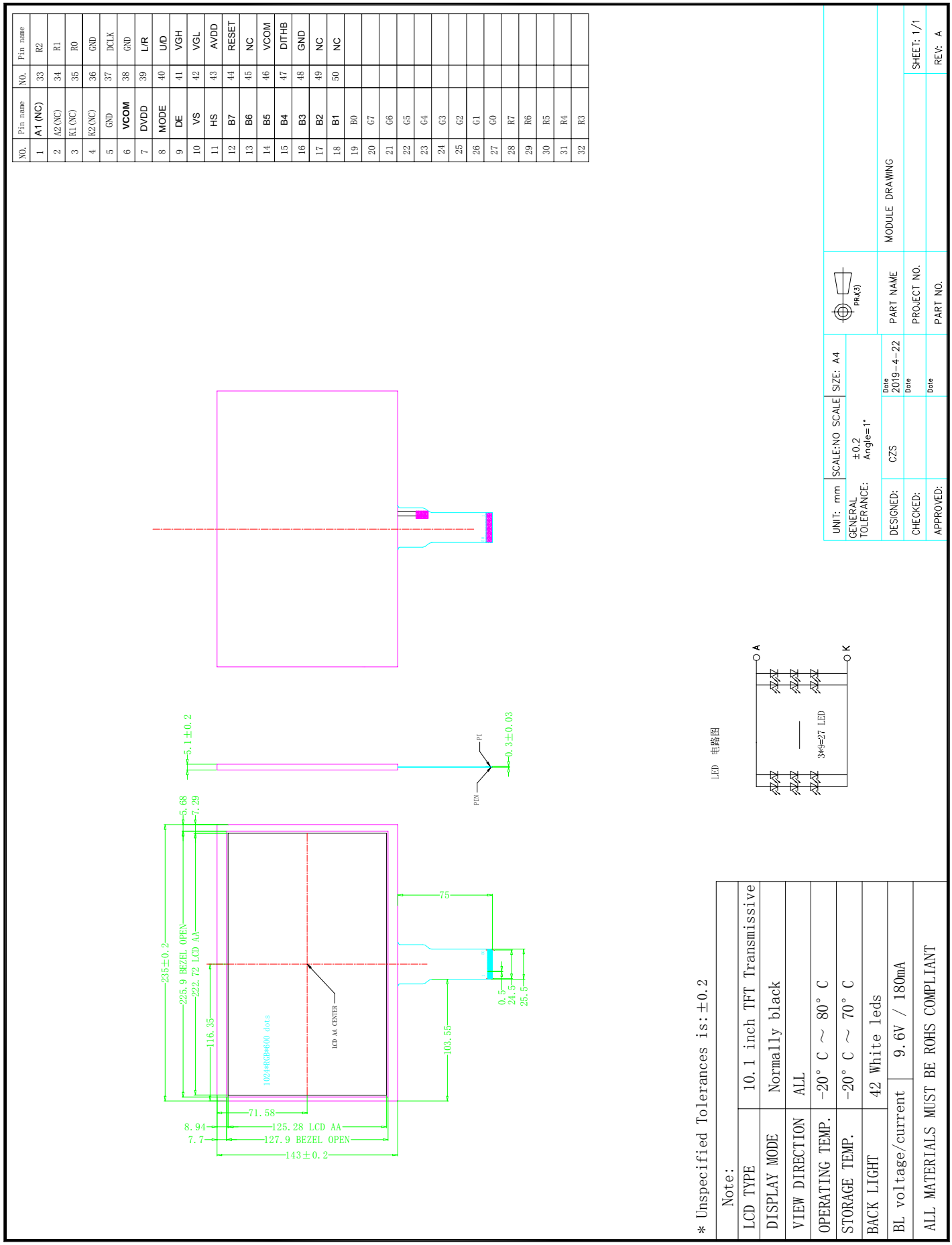
Item	Contents	Unit
LCD type	TFT TRANSMISSIVE	---
Viewing direction	6	o'clock
Module size (W×H×T)	235 × 143 × 5.1	mm^3
Active area(W×H)	222.72×125.28	mm^2
Number of dots(W×H)	1024(RGB) × 600	dots
Pixel Pitch(H×V)	0.2175×0.2088	mm
Driver IC	EK79001	---
Colors	16.7M	---
Backlight Typ		---
Interface Type	LVDS	---

2. BLOCK DIAGRAM



3. Mechanical Dimension

NO.	Pin name	NO.	Pin name
1	A1 (NC)	33	R2
2	A2 (NC)	34	R1
3	K1 (NC)	35	R0
4	K2 (NC)	36	GND
5	GND	37	DCLK
6	VCOM	38	GND
7	DVDD	39	L/R
8	MODE	40	U/D
9	DE	41	VGH
10	VS	42	VGL
11	HS	43	AVDD
12	B7	44	RESET
13	B6	45	NC
14	B5	46	VCOM
15	B4	47	DITHB
16	B3	48	GND
17	B2	49	NC
18	B1	50	NC
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		



Note:	
* Unspecified Tolerances is: ±0.2	
LCD TYPE	10.1 inch TFT Transmissive
DISPLAY MODE	Normally black
VIEW DIRECTION	ALL
OPERATING TEMP.	-20° C ~ 80° C
STORAGE TEMP.	-20° C ~ 70° C
BACK LIGHT	42 White leds
BL voltage/current	9.6V / 180mA
ALL MATERIALS MUST BE ROHS COMPLIANT	

4. Pin Descriptions

Pin No.	Symbol	Functional	Notes
1	VCOM	Common Voltage	
2~3	VDD	Power Supply for digital circuit	
4	NC	No connection	
5	RESET	Global reset pin	
6	STBYB	Standby mode, Normally pulled high	
7	GND	Ground	
8	Rin0-	-LVDS differential data input	
9	Rin0+	+LVDS differential data input	
10	GND	Ground	
11	Rin1-	-LVDS differential data input	
12	Rin1+	+LVDS differential data input	
13	GND	Ground	
14	Rin2-	-LVDS differential data input	
15	Rin2+	+LVDS differential data input	
16	GND	Ground	
17	RclkIN-	-LVDS differential clock input	
18	RclkIN+	+LVDS differential clock input	
19	GND	Ground	
20	Rin3-	-LVDS differential data input	
21	Rin3+	+LVDS differential data input	
22	GND	Ground	
23-24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	NC	NC	
28	SELB	6bot/8bit mode select ， L=8 BIT ， H=6BIT	
29	AVDD	Power for Analog Circuit	
30	GND	Ground	
31-32	LED-	LED Cathode	
33	L/R	Horizontal inversion	
34	U/D	Vertical inversion	
35	VGL	Gate OFF Voltage	
36	NC	NC	
37	NC		
38	VGH	Gatr ON Voltage	
39-40	LED+	LED Anode	

5. OPERATION SPECIFICATION

5.1 Absolute maximum ratings

Parameter	Symbol	Min	Max	Unit
Power supply1	V_{DD}	-0.5	+3.96	V
Power supply2	Avdd	-0.5	+13.85	V
Operating temperature	T_{OPR}	-10	50	℃
Storage temperature	T_{STG}	-20	60	℃

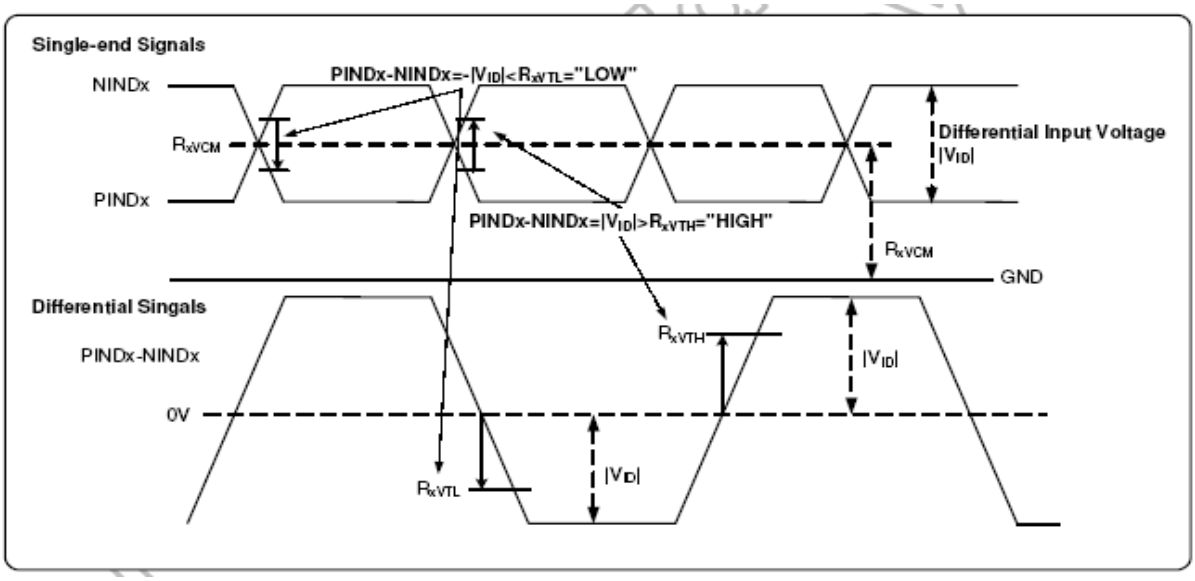
5.2 Input driver voltage

Parameter	Symbol	Value	Unit	Remarks
TFT Gate ON Voltage	VGH	21	V	
TFT Gate Off Voltage	VGL	-8	V	
TFT Common Electrode Voltage	VCOM	3.8	V	NOTE
Analog Power Supply Voltage	AVDD	10.8	V	

Note: Please adjust Vcom to make the flicker level be minimum

6. DC ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	VDD-1.2+ $\|V_{ID}\|/2$	V	-
Differential input common Mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	-	VDD-1.2	V	-
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	-
Differential input leakage Current	RV_{Xliz}	-10	-	+10	μA	-
LVDS Digital Operating Current	Iddlvds	-	15	30	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	-	10	50	μA	Clock & all Functions are stopped



Parameter	Symbol	Spec. Min.	Typ.	Max.	Unit	Condition
Base drive current for PWM	IDRV	-	-	60	mA	R_{XVCM} =1.2V
DRV output voltage for PWM	VDRV	0	-	VDD	V	
Feed back voltage for PWM	VFB	0.55	0.6	0.65	V	-
Duty cycle maximum	Dmax	-	-	85	%	-
VCOM buffer input voltage	VCOMI	1	-	AVDD	V	-
VCOM buffer output voltage	VCOMO	VCOMI-0.2	VCOMI	VCOMI+0.2	V	-
VCOM buffer output current	IVCOM	-	-	10	mA	Fclk=65MHz, VDD=3.3V

7. Parallel RGB input timing table

Resolution:1024x600

DE mode

Parameter	Symbol	Spec. Min.	Typ.	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	tvbp	610	635	800	T_H
VSD Blanking	tvbp+ tvfp	10	35	200	T_H

HV mode :

Horizontal timing

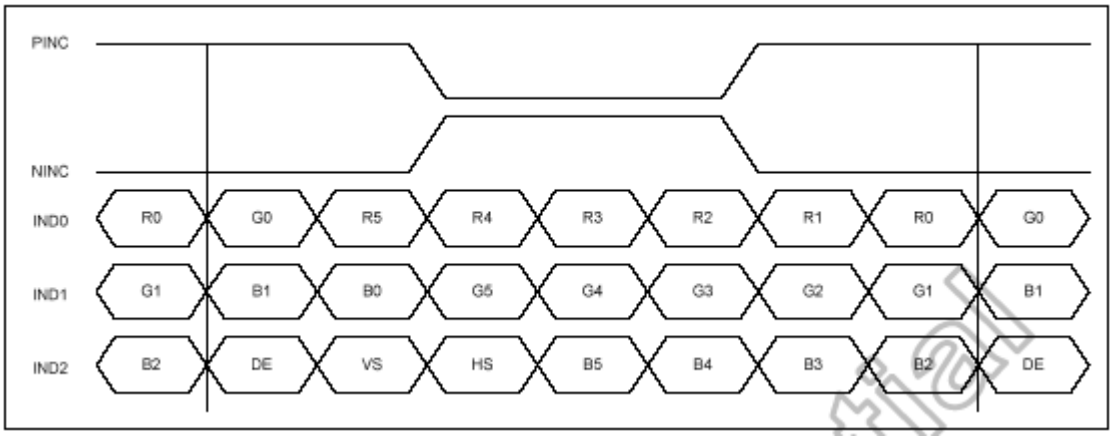
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp		160		DCLK
HSD Front Porch	thfp	16	160	216	DCLK

Vertical Timing

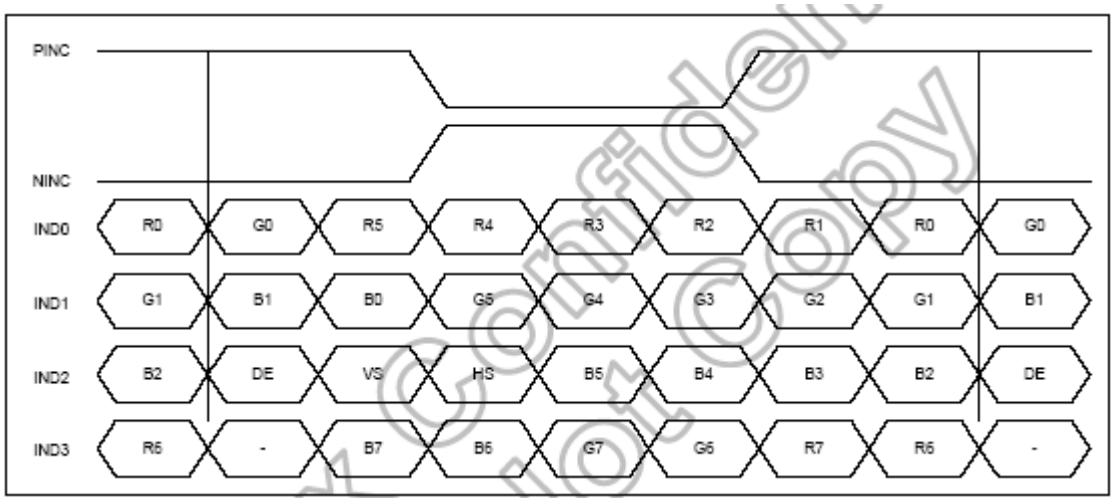
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T_H
VSD Period	tv	624	635	750	T_H
VSD Pulse Width	tvpw	1	-	20	T_H
VSD Back Porch	tvbp		23		T_H
VSD Front Porch	tvfp	1	12	127	T_H

8. Data input format for LVDS

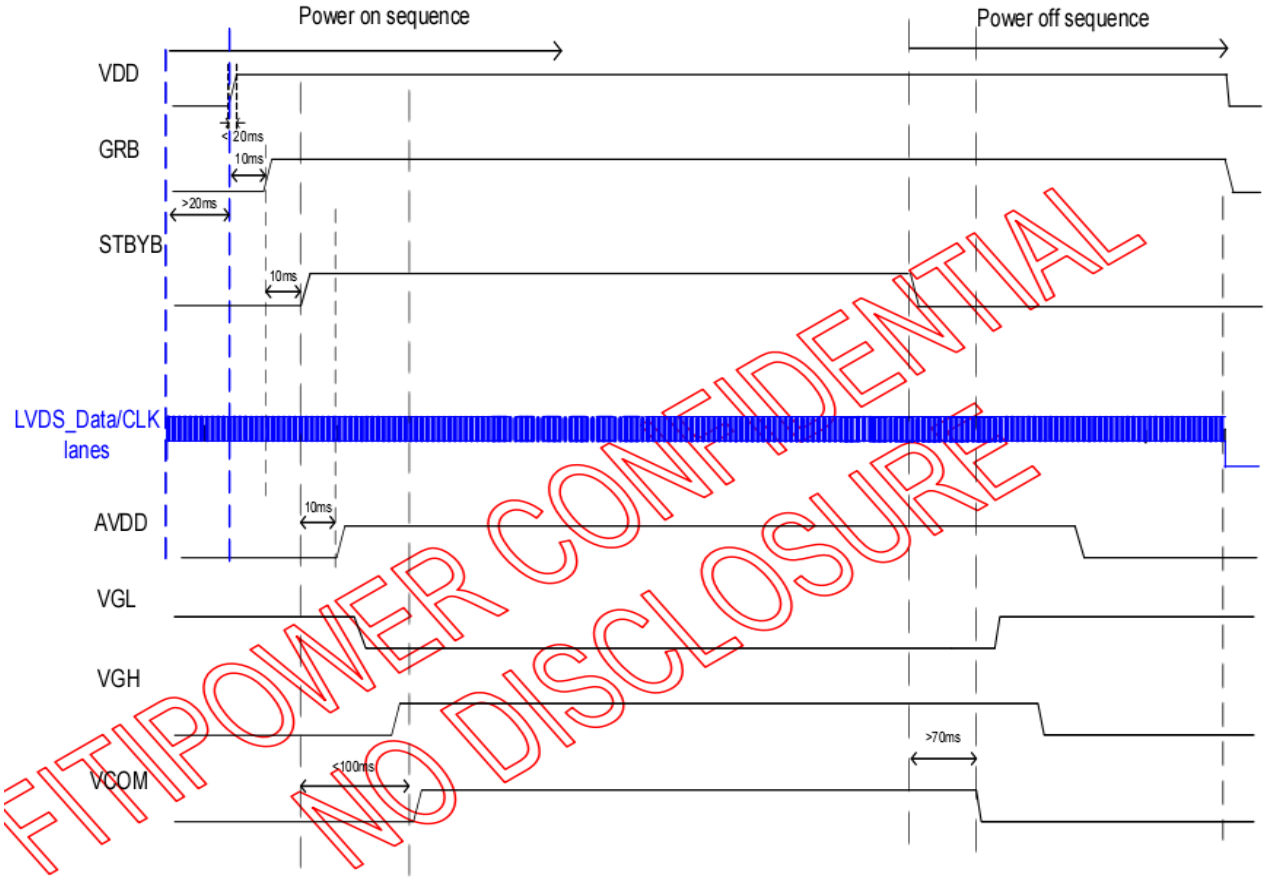
8.1 For 6-Bit LVDS



8.2 For 8-Bit LVDS



8.3 Power on/off timing sequence for LVDS interface



Note LVDS data/CLK more than 20ms before VDD

9. Backlight Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V_{LED}	--	9.6	--	V
LED module current	I_{LED}	--	280	--	mA
L/G Surface Luminance ★1	L_S	--	400	--	mcd
LCM Surface brightness uniform ★2	L_D	80	--	--	%

★ 1 Test condition is:

(a) Center point on active area.

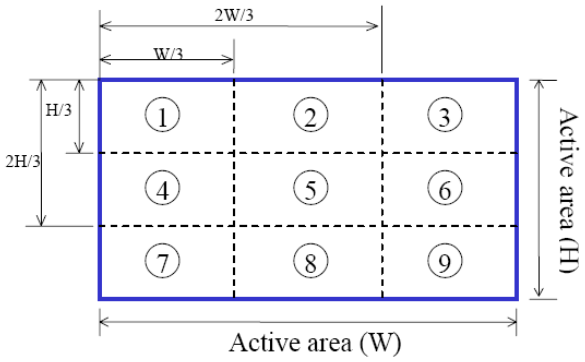
(b)Best Contrast.

★2 Uniform measure condition:

(1)Measure 9 point. Measure location show below;

(2)Uniform=(Min. brightness /Max. brightness)*100%

(3)Best Contrast.



10.Electro-optical Characteristics

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing angle range	Hor.	φ3	CR≥10		70		Deg	
		φ9			70		Deg	
	Ver.	φ12			60		Deg	
		φ6			70		Deg	
Color gamut (C light)					50		%	
Luminance Contrast ratio		T(%)	φ0°		600			
Response Time		TRT	Temp=25° C		8		ms	

11. Reliability

11.1 Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal

11.2 Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	80℃*12Hrs	NoDefectOfOperational Function In Room Temperature Are Allowable
2	Low Temperature Non-Operating Test	-20℃*12Hrs	
3	High Temperature/Humidity Non Operating Test	60℃*75%RH*120Hrs	
4	High Temperature Operating Test	70℃*120Hrs	
5	Low Temperature Operating Test	-20℃*120Hrs	
6	Thermal Shock Test	-10℃(30Min) - 50℃(30Min) *10CYCLES	

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

12. Inspection standards

1.AQL(Acceptable Quality Level

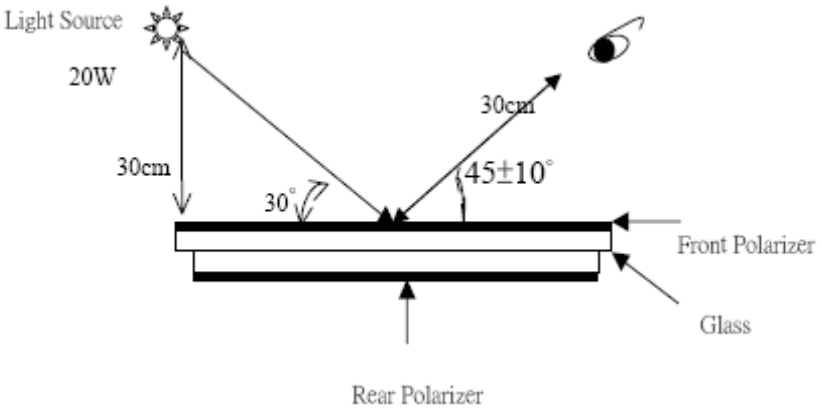
AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.5

2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is 1000±200.(Darkroom's lux: 100±50),About an angle of incidence 30,a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!

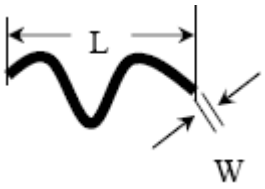
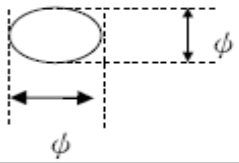
(As shown below)



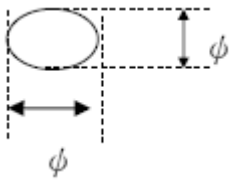
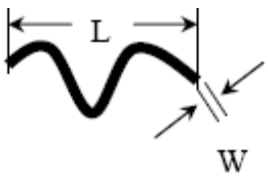
3.Inspection item and criteria

3.1 Visual inspection criterion in immobility

3.1.1 LCD appearance defect(View area)

NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		W≦0.03mm	disregard	
		0.03mm<W≦0.05mm; L≦3.0mm	2	
		0.05mm<W≦0.1mm; L≦3.0mm	1	
		W>0.1mm;L>3.0mm	0	
2	Polarizer bubble、concave and convex (minor defect)	Φ≦0.2mm	disregard	note1: Φ=(L+W)/2, L:Length, W :Width note2:disregard if out of AA
		0.2mm<Φ≦0.3mm	2	
		0.3mm<Φ≦0.5mm	1	
		0.5mm<Φ	0	
3	Black dots、dirty dots、impurities、eye winker (minor defect)	Φ≦0.15mm	disregard	note2:disregard if out of AA 
		0.15mm<Φ≦0.25mm	2	
		0.25mm<Φ≦0.3mm	1	
		0.3mm<Φ	0	
4	Polarizer prick (minor defect)	Φ≦0.1mm	disregard	note1: Φ=(L+W)/2, L=Length, W=Width note2:the distance between two dots>5mm
		0.1mm<Φ≦0.25mm	3	
		Φ>0.25mm	0	

3.2Electrical criteria

NO	Defect item	Criteria	Remark	
1	No display (major defect)	No display 【Reject】		
2	Missing line (major defect)	Missing line 【Reject】		
3	Seg-com light and dark (major defect)	Seg-com light and dark 【Reject】	ND filter 2% test	
4	No display in immobility (major defect)	No display in immobility 【Reject】		
5	Flicker of Pattern (major defect)	Flicker of Pattern 【Reject】		
6	Mura (major defect)	ND filter 2%test		
7	Over current (major defect)	Over current 【Reject】		
8	Voltage out of specification (major defect)	Voltage out of specification 【Reject】		
9	Pattern blur, error code (major defect)	Pattern blur, error code 【Reject】		
10	Dark light, Flicker (major defect)	Dark light, Flicker 【Reject】		
11	Black/white dots 、 Dirty dots、eye winker (major defect)	Specification	Allowable	Note1:disregard if out of AA 
		Φ ≦0.15mm	disregard	
		0.15mm< Φ ≦0. 25㎜	2	
		0.25mm< Φ ≦0. 3㎜	1	
		0.3mm< Φ	0	
12	Fiber、glass crutch、Polarizer scratch/folded (major defect)	W≦0.03mm	disregard	Note1:L: Length, W: Width Note2: disregard if out of AA 
		0.03mm<W≦0. 0. 05㎜ L≤3. 0㎜	2	
		0.05mm<W≦0. 1㎜ L≤3. 0㎜	1	
		W>0.1mm;L>3.0mm	0	

13.Precautions for using LCD modules.

13.1 Safety

(1)Do mot swallow any liquid crystal ,even if there is no proof that liquid crystal is poisonous.
(2)If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3)If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

13.2 Storage Conditions

(4)Store the panel or module in a dark place where the temperature is 23±5℃and the humidity is below 45±20%RH.
(5)Store in anti-static electricity container.
(6)Store in clean environment, free from dust, active gas, and solvent.
(7)Do not place the module near organics solvents or corrosive gases.
(8))Do not crush, shake, or jolt the module.

13.3Handling Precautions

(9)Avoid static electricity, which can damage the CMOS LSI.
(10)The polarizing plate of the display is very fragile, please handle if very carefully.
(11)Do not give external shock.
(12)DO mot apply excessive force on the surface.
(13)Bo not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(14)Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(15)Do not operate it above the absolute maximum rating.
(16)Do not remove the panel or frame from the module.

13.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.