



APPROVAL SHEET
承认书

Customer 客户名称	
Part NO. 产品型号	FSD7S150BS-B5+CTP
Product type 产品内容	Mode: Transmissive type .NormallyBLACK. TFT LCD Module LCD Module: Graphic1024RGB*600Dot-matrix
Remarks 备注栏	☐ APPROVAL FOR SEPCIFICATIONS ONLY ☒ APPROVAL FOR SEPCIFICATIONS AND SAMPLE
Signature by Customer: 客户确认签章	

LEAGEND LCM R&D CENTER:

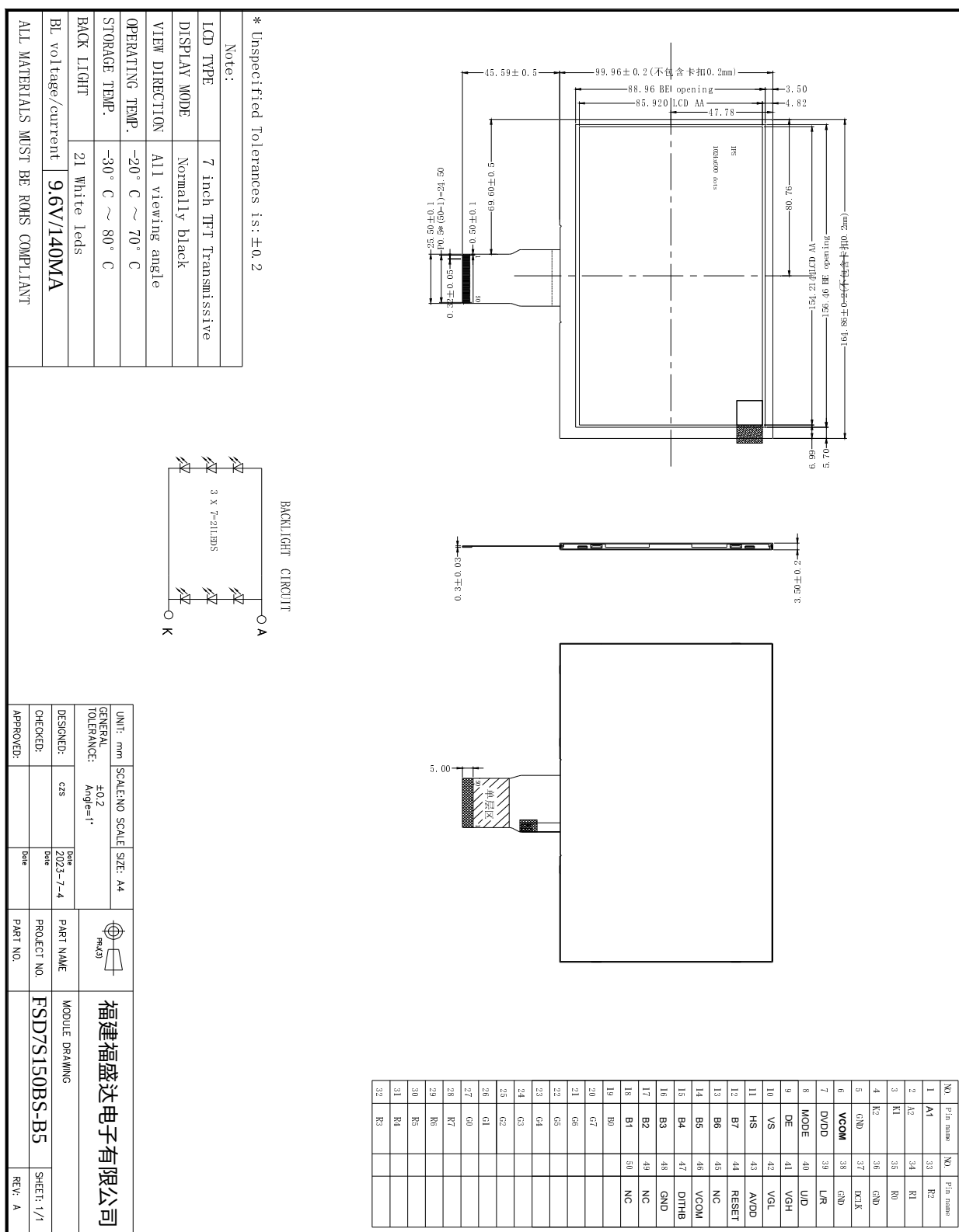
Technical Department: 研发部门	Quality Assurance Department 质量保证部门	Approved by:核准
Iijian	LaiYong	Kevin



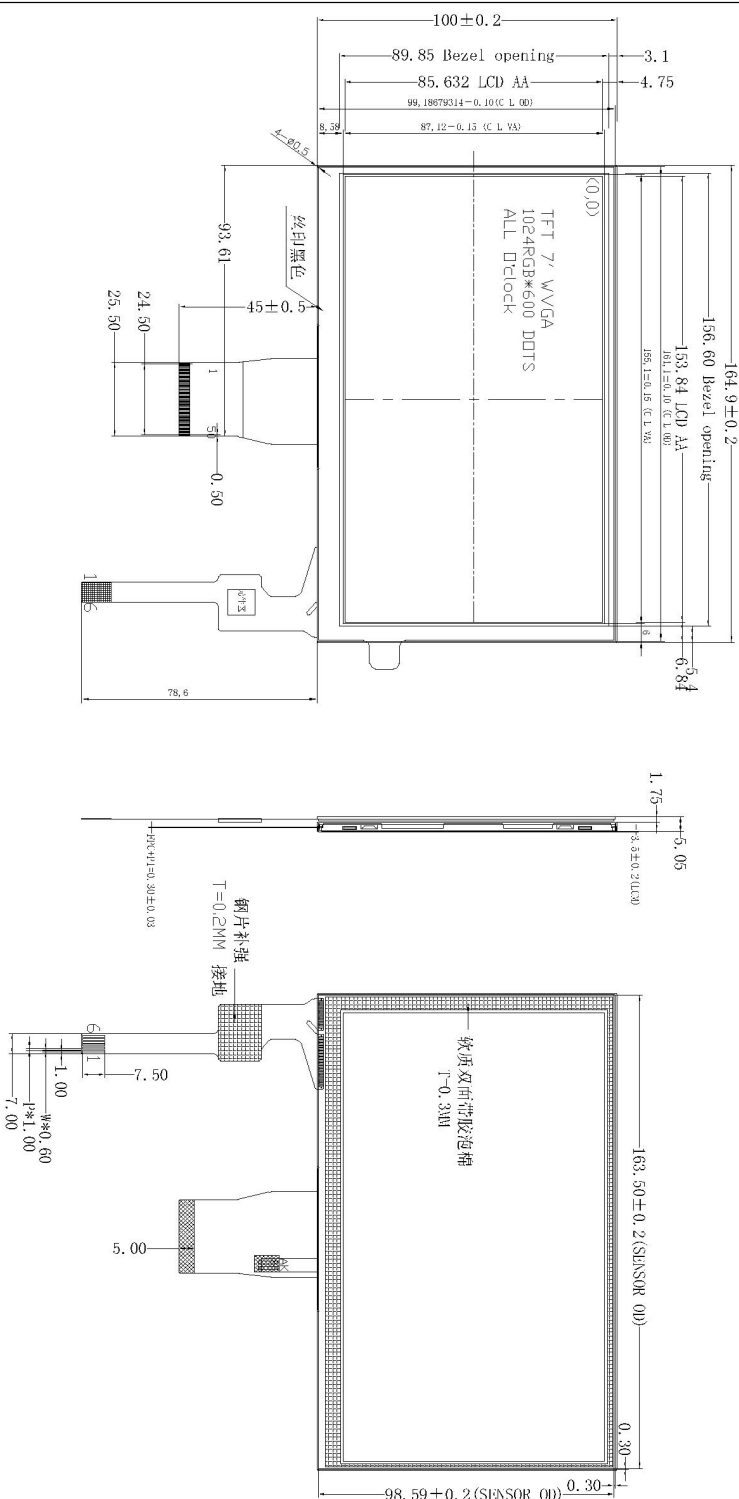
1. PHYSICAL DATA（物理数据）

Item 条目	Contents 内容	Unit 单位
LCD type LCD 类型	TFT TRANSMISSIVE(BOE)	---
Viewing direction 观察方向	All	o'clock
Module size (W×H×T) 模组尺寸	165 × 100 × 3.5	mm ³
Active area(W×H) 活动区域	154.2144×85.92	mm ²
Number of dots(W×H) 分辨率	1024(RGB) × 600	dots
Pixel Pitch(W×H)) 像素间距	0.1506×0.1432	mm
Driver IC 驱动芯片		---
Colors 颜色	16.7M	---
Backlight Type 背光类型	21 white leds 9.6V 140mA	---
Interface Type 接口类型	RGB	---

2. Mechanical Dimension (机械尺寸)



NO	Pin name	NO	Pin name
1	A1	33	R2
2	A2	34	R1
3	K1	35	R0
4	K2	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	DTTB
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		



* Unspecified Tolerances is: ± 0.2

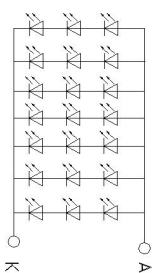
Note:	
LCD TYPE	7 inch TFT Transmissive
DISPLAY MODE	Normally BLACK
VIEW DIRECTION	ALL' clock
OPERATING TEMP.	-20° C ~ 70° C
STORAGE TEMP.	-30° C ~ 80° C
BACK LIGHT	21 White leds
Bl. voltage/current	9.6V / 140mA
ALL MATERIALS MUST BE ROLLS COMPLIANT	

技术要求:

1. 结构: CG
2. IC型号: GT911
3. 透光率: $\geq 85\%$, 雾化率 $\leq 3\%$
4. 工作温度范围: $-20^{\circ}\text{C}^{\circ}\text{C}^{\circ} 70^{\circ}\text{C}$, $\pm 5\%$ SS304H 储存温度范围: $-30^{\circ}\text{C}^{\circ} 80^{\circ}\text{C}$, $\pm 5\%$ SS304H
5. 表面硬度: $\geq 61\text{H}$
6. 玻璃材质: 0.70mm 厚
7. CG表面应力 $\text{CS} \geq 450\text{N/mm}^2$ 强化浓度 $\text{DOL} \geq 10\text{um}$
8. 未标注公差: ± 0.20

11. 底板背面油墨及FILM达因值 ≥ 32 dyn

制作



BACKLIGHT CIRCUIT

1	GND
2	SDA
3	SCL
4	RST
5	INT
6	VDD

UNIT: mm	SCALE/NO SCALE	SIZE: A4	福建福盛达电子有限公司	
GENERAL TOLERANCE:	±0.2 Angle=1°			
DESIGNED:	Date: 2024-05-22	PART NAME		
CHECKED:	Date	PROJECT NO.	MODULE DRAWING	SHEET: 1/1
Auto	Date	PART NO.	FSDTS150BS-3B+C1P	REV: A



3. Pin Descriptions (管脚说明)

Pin No. 管脚编号	Symbol 记号	Functional 作用
1	LED A	LED Anode LED 正极
2	LED A	LED Anode LED 正极
3	LED K	LED Cathode LED 负极
4	LED K	LED Cathode LED 负极
5	GND	Digital Ground 数字接地
6	VCOM	For external VCOM DC input 外部 VCOM DC 输入
7	DVDD	Digital Power 数字电源
8	MODE	DE/SYNC mode select DE/SYNC 模式选择 MODE=H: DE mode(normally pull high) MODE=H:ED 模式 (一般拉高) MODE=L: HSD/VSD mode MODE=L:HSD/VSD 模式
9	DE	Data enable signal 数据使能信号
10	VSYNC	Vertical sync input.Negative polarity 垂直同步输入: 极性负极
11	HSYNC	Horizontal sync input.Negative polarity 水平同步输入: 极性负极
12~19	B7~B0	Blue data Input 蓝色数据输入
20~27	G7~G0	Green data Input 绿色数据输入
28~35	R7~R0	Red data Input 红色数据输入
36	GND	Digital Ground 数字接地数字接地
37	DCLK	Clock input 时钟输入



38	GND	Digital Ground 数字接地
39	L/R	Source right or left sequence control 来源右、左序列控制 SHLR=H: right shift, Left → Right SHLR=H:右移, 左→右 SHLR=L: left right, Right → Left SHLR=L:左移, 右→左
40	U/D	Gate up or down scan control 闸门上下扫描控制 UPDN=H: up shift, Down → Up UPDN=H:上移, 下→上 UPDN=L: down shift, Up → Down
41	VGH	Positive Power for TFT TFT 开启电压
42	VGL	Negative Power for TFT TFT 关闭电压
43	AVDD	Analog Power 模拟电源
44	RSTB	Global reset pin.Active low to enter reset state 全局复位管脚。低电平激活进入复位状态。 Suggest to connecting with an RC reset circuit for stability. 建议重置电路连接电容电阻以保持电路稳定。 Normally pull high. (RC circuit :R=10K Ω , C=1uF))
45	NC	Not connect 无连接
46	VCOM	For external VCOM DC input 外部 VCOM DC 输入
47	DITHB	Dithering setting 抖动设置 DITH="H" 6-bit resolution (last 2 bits of input data turncated) DITH="H" 6 位分辨率 (最后两位输入数据无效) DITH="L" 8-bit resolution (default setting)
48	GND	Digital Ground 数字接地
49	NC	Not connect 断连接
50	NC	Not connect 断连接



4. OPERATION SPECIFICATION （操作说明）

4.1 Absolute maximum ratings （绝对最大额定值）

Parameter 参数	Symbol 记号	Min 最小	Max 最大	Unit 单位
Power supply1 电源供给1	V _{DD}	-0.5	+3.96	V
Power supply2 电源供给2	A _{vdd}	-0.5	+13.8	V
Operating temperature 运行温度	T _{OPR}	-20	70	°C
Storage temperature 存储温度	T _{STG}	-30	80	°C

4.2 Input voltage 输入电压

Parameter	Symbol	Min	Max	Unit	Remarks
Power For Analog Circuit	AVDD	9	11	V	VGH-VGL <=32V
TFT Gate ON Voltage	VGH	18	20	V	
TFT Gate OFF Voltage	VGL	-8.5	-7.5	V	
TFT Common Electrode Voltage	VCOM	2.7	4.94	V	

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

注意：请调整 VCOM，让闪烁程度降到最低



5. DC ELECTRICAL CHARACTERISTICS 直流电特性

Parameter	Symbol	Spec.			Unit	Condition
		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	6.5	-	13.5	V	Full range application 应用范围
电压供给		4	-	6.75	V	Half AVDD application 应用AVDD一半
Power supply voltage	AGNDH	0			V	Full range application 全范围
		4	-	6.75	V	Half AVDD application
Low level input voltage 低压输入	V _{IL}	0	-	0.3VDD	V	For digital circuit 数字环
High level input voltage 高压输入	V _{IH}	0.7VDD	-	VDD	V	For digital circuit
Output low voltage 低压输出	V _{OL}	-	-	GND+0.4	V	I _{OL} =400μA
Output high voltage 高压输出	V _{OH}	VDD-0.4	-	-	V	I _{OH} =400μA
Pull low/high resistance 高/低电阻	R _i	200	250	300	kΩ	For the digital input pin @VDD=3.3V
Input leakage current 输入电流泄漏		-	-	±1	μA	For digital circuit
Digital Operation current 数字操作电流	I _{dd}	-	12	20	mA	Fclk=50MHz, LD=48KHz, VDD=3.3V, No load
Digital stand-by current 数字备用电流	I _{st1}	-	10	50	μA	Clock & all functions are stopped 所有功能停止
Analog Operating current 模拟操作电流	I _{dda}	-	8	10	mA	No load, Fclk=50MHz, LD=48KHz @ AVDD=10V, V1=8V, V14=0.4V
Analog Stand-by current 模拟备用电流	I _{st2}	-	10	50	μA	No load, clock & all functions are stopped 无负载, 时钟&所有功能停止
Input level of V1~V7 输入级数	Vref1	0.4AVDD	-	AVDD-0.1	V	Gamma correction voltage input
Input level of V8~V14	Vref2	0.1	-	0.6AVDD	V	Gamma correction voltage input gamma校正电压输入
Output Voltage deviation 输出电压偏离	Vod1	-	±20	±35	mV	V _o =AGND+0.1V~AGND+0.5V & V _o =AVDD-0.5V~AVDD-0.1V
Output Voltage deviation	Vod2	-	±15	±20	mV	V _o =AGND+0.5V~AVDD-0.5V
Output Voltage Offset between Chips 输出电压重置	Voc	-	-	±20	mV	V _o =AGND+0.5V~AVDD-0.5V
Dynamic Range of Output 动态输出变化	Vdr	0.1	-	AVDD-0.1	V	SO1~SO1200
Sinking Current of Outputs 输出下沉电流	IOLy	80	-	-	μA	SO1~SO1200; V _o =0.1V vs. 1.0V, AVDD=13.5V
Driving Current of Outputs 输出驱动电流	IOHy	80	-	-	μA	SO1~SO1200; V _o =0.1V vs. 12.5V, AVDD=13.5V
Resistance of Gamma Table 伽马支持表	Rg	0.7*Rn	1.0*Rn	1.3*Rn	Ω	Rn: Internal gamma resistor 内部gamma电阻

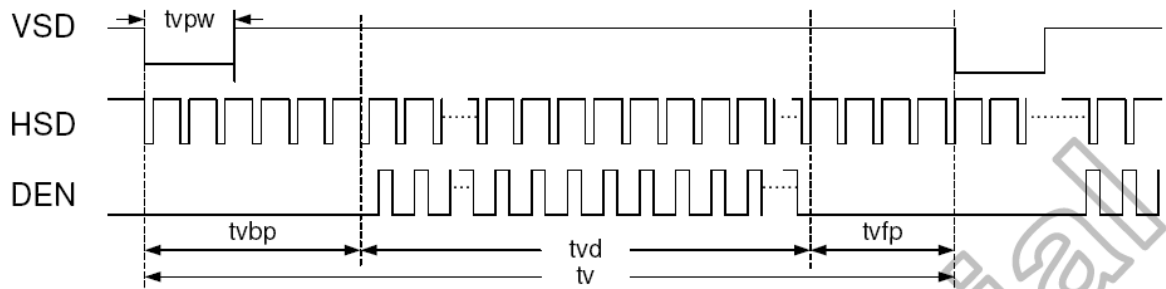


6. AC ELECTRICAL CHARACTERISTICS 交流电气特性

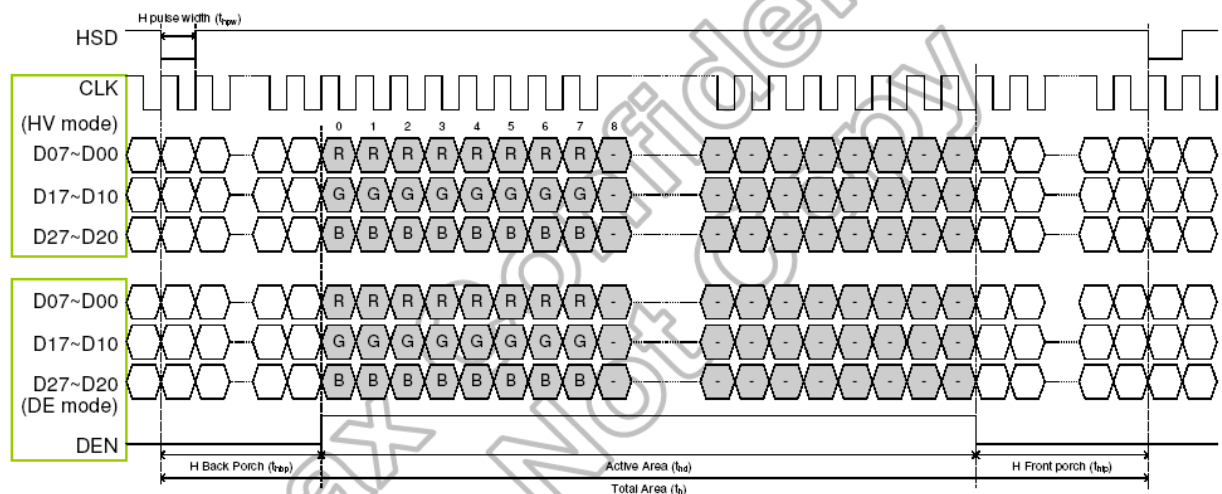
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
转向率 VDD Power On Slew rate	T_{POR}	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width 脉冲宽度	T_{Rst}	50	-	-	μ s	DCLK=65MHz
DCLK cycle time 循环时间	T_{cph}	14	-	-	ns	-
DCLK pulse duty 脉冲职责	T_{cwh}	40	50	60	%	-
VSD setup time 设置时间	T_{vst}	5	-	-	ns	-
VSD hold time 保持时间	T_{vhd}	5	-	-	ns	-
HSD setup time 设置时间	T_{hst}	5	-	-	ns	-
HSD hold time 保持时间	T_{hhd}	5	-	-	ns	-
Data set-up time 数据设置时间	T_{dsu}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
Data hold time 数据保持时间	T_{dhd}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
DE setup time 设置时间	T_{esu}	5	-	-	ns	-
DE hold time 保持时间	T_{ehd}	5	-	-	ns	-
Output stable time 输出稳定时间 T_{sst}				6	μ s	10% to 90% target voltage. CL=90pF, R=10K ohm (Cascade)
				3		Dual gate

7. Data input format 输入数据格式

Vertical input timing 垂直输入定时



Horizontal timing





● DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency 频率	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area 水平显示区	thd	1024			DCLK
HSD Period 周期	th	1114	1344	1400	DCLK
HSD Blanking 空白期	thb+ thfp	90	320	376	DCLK
Vertical Display Area 垂直显示区	tvd	600			T _H
VSD Period 周期	tvbp	610	635	800	T _H
VSD Blanking 空白期	tvbp+ tvfp	10	35	200	T _H

HV mode

Horizontal timing 水平时间

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency 频率	fclk	44.9	51.2	63	MHz
Horizontal Display Area 水平显示区	thd	1024			DCLK
HSD Period 周期	th	1200	1344	1400	DCLK
HSD Pulse Width 脉冲宽度	thpw	1	-	140	DCLK
HSD Back Porch 后沿	thbp	160			DCLK
HSD Front Porch 前沿	thfp	16	160	216	DCLK

Vertical Timing 垂直时间

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area 垂直显示区	tvd	600			T _H
VSD Period 周期	tv	624	635	750	T _H
VSD Pulse Width 脉冲宽度	tvpw	1	-	20	T _H
VSD Back Porch 后沿	tvbp	23			T _H
VSD Front Porch 前沿	tvfp	1	12	127	T _H

8. Backlight Characteristic (背光特性)

Item 条目	Symbol 记号	Min 最小	Typical 一般值	Max 最大值	Unit 单位
LED module Forward voltage LED 模块正向电压	V _{LED}	9.0	9.3	9.6	V
LED module current LED 模块电流	I _{LED}	--	140	--	mA
L/G Surface Luminance ★1 LCM 表面亮度★1	L _S	--	--	--	mcd
LCM Surface brightness uniform ★2 LCM 表面均匀亮度	L _D	80	--	--	%



★ 1 Test condition is: (测试条件)

(a) Center point on active area. (中心点在活动区域)

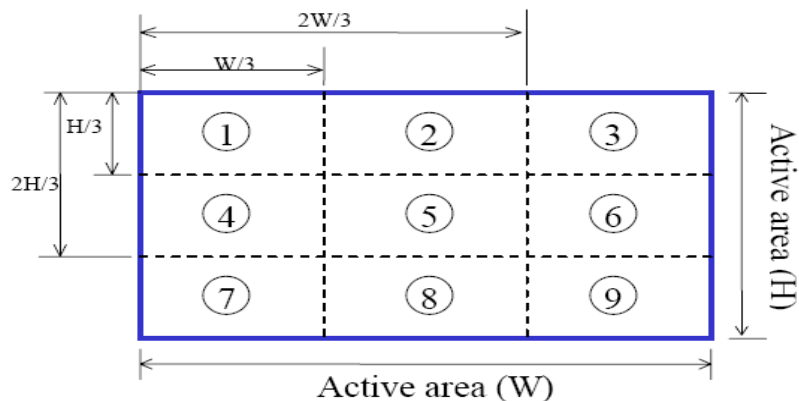
(b) Best Contrast. (最佳对比)

★2 Uniform measure condition: (统一测量条件)

(1) Measure 9 point. Measure location show below; (个测量点, 测量位置如下)

(2) $\text{Uniform} = (\text{Min. brightness} / \text{Max. brightness}) * 100\%$ (标准 = (最小.亮度/最大.亮度) * 100%)

(3) Best Contrast. (最佳对比)



9. Electro-optical Characteristics (电光特性)

Parameter 参数		Symbol 记号	Condition 条件	Min. 最小	Typ. 类型	Max 最大	Unit 单位	Remark 备注
Viewing angle range 视角范围	Hor.	$\phi 3$	$CR \geq 10$	80	85		Deg.	
		$\phi 9$		80	85		Deg.	
	Ver.	$\theta 12$		80	85		Deg.	
		$\theta 6$		80	85		Deg.	
Color gamut (C light) 色域 (C 光)					50		%	
Luminance Contrast ratio 对比度		T (%)	$\phi 0^\circ$	600	800			
Response Time 响应时间		T_{RT}	Temp=25° C		25	40	ms	



10. Reliability (可靠性)

10.1 Mtbf

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

LCD 模块设计应满足正常使用 MTBF 最小值为 50000 小时

10.2 Test condition (测试条件)

NO. 编号	Test Item 测试项目	Test condition 测试条件	CRITERION 标准
1	High Temperature Storage 高温测试	80℃±2℃ 96H Restore 2H at 25℃ Power off 80℃±2℃96H 25℃下恢复 2H 关闭电源	
2	Low Temperature Storage 低温测试	-30℃±2℃ 96H Restore 2H at 25℃ Power off -30℃±2℃96H 25℃下恢复 2H 关闭电源	
3	High Temperature Operating 高温工作测试	70℃±2℃ 96H Restore 2H at25℃ Power on 70℃±2℃96H 25℃下恢复 2H 打开电源	
4	Low Temperature Operating 低温工作测试	-20℃±2℃ 96H Restore 2H at 25℃ Power on 低温运行 低温工作测试-20℃±2℃96H 25℃下恢复 2H 打开电源	
5	High Temperature/Humidity Non Operating 高温、湿度不工作测试	50℃±2℃ 90%RH 96H Power on 50℃±2℃90%相对湿度 96H 打开电源	



6	Temperature Cycle 温度循环测试	-30℃ ←→ 80℃ 30min 30min After 10cycle, Restore 2H at 25℃ Power off 温度循环 温度循环测试 -30℃ ←→ 80℃ 30 分钟 30 分钟 10 次循环后，在 25℃ 下恢复 2H 关闭电源	After testing, cosmetic And electrical defects Should not happen. 测试后和电气缺陷没有发生
7	Vibration Test 振动测试	10Hz~45Hz, 100m/s ² , 120min	
8	Shock Test 冲击实验	Half-sine wave, 300m/s ² , 11ms Half 正弦波, 300m/s², 11ms	
9	Drop Test(package state) 跌落实验	800mm, concrete floor, 1 corner, 3 edges, 6 sides each time 800mm, 80mm 跌落地板, 1 角, 3 边, 6 边, 每个 time	1. After testing, cosmetic and electrical defects should not happen. 测试后, 不应出现外观 和电气缺陷 2. The product should remain at initial place 产品应保持在 初始位置 3. Product uncovered or package broken is not permitted. 不允许产品裸露或 包装破损。
10	Electro Static Discharge Test 静电测试	150pF, 330Ω, Contact: ±4KV, Air: ±8KV Measure point: LCD glass and Metal bezel 测量点: LCD 玻璃 和金属挡板	IEC61000-4-2:2001 GB/T17626.2-2006

Notes:

- Judgments should be made after exposure in room temperature for two hours.
应在室温下两小时后判断是否正常
- The distilled water is used for the high temperature/humidity test.
用蒸馏水做高温和湿度测试
- The sample above is individually for every reliability tests condition.

样品适用于以上可实现的条件测试

11. Inspection standards (标准检验)

1.AQL(Acceptable Quality Level (可接受质量等级))

AQL of major and minor defect. (AQL 主要和次要的问题)

	MAJOR DEFECT 主要问题	MINOR DEFECT 次要问题
AQL	0.65	1.5

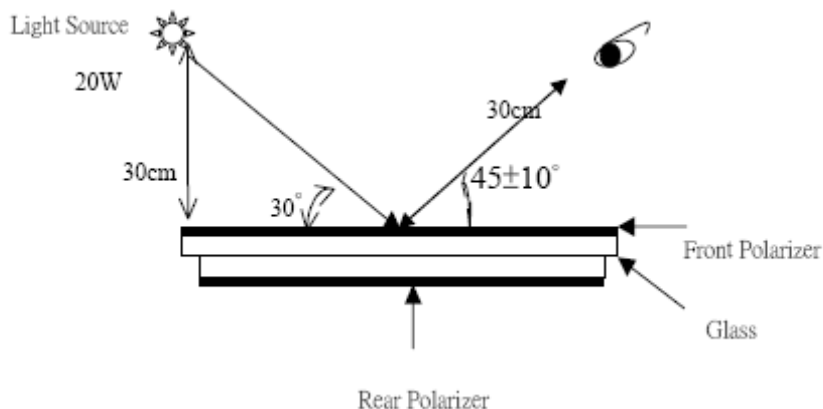
2. Basic conditions for inspection (检验的基本条件)

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!

LCM 面对我们，在正常环境下，lux 为 1000 ± 200 。（黑屋 lux 为 100 ± 50 ）光源入射角为 30° 度，在距离 30cm， 45° 度角处，不揭膜检测产品。

(As shown below)

(如下所示)



12. Precautions for using LCD modules. (使用 LCD 模块注意事项)

12.1 Safety (安全)

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.

请勿吞咽任何液晶，即使目前没有任何证据证明液晶是有毒的

(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.

如果 LCD 面板打碎，小心不要让液晶接触到你的皮肤

(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

如果皮肤接触到液晶，用酒精或肥皂水彻底清洗该区域

12.2 Storage Conditions (存储条件)



(4)Store the panel or module in a dark place where the temperature is $23 \pm 5^{\circ}\text{C}$ and the humidity is below $45 \pm 20\%\text{RH}$.

存储面板和组件在背光、温度 $23 \pm 5^{\circ}\text{C}$ 、湿度 $45 \pm 20\%\text{RH}$ 的地方。

(5)Store in anti-static electricity container.

存储在防静电的容器中

(6)Store in clean environment, free from dust, active gas, and solvent.

存储在干净的环境，远离灰尘，活性气体，溶剂

(7)Do not place the module near organics solvents or corrosive gases.

请勿放置模块在有机溶剂或腐蚀性气体附近

(8) Do not crush, shake, or jolt the module.

请勿挤压，摇晃或者颠簸模块

12.3 Handling Precautions（操作注意事项）

9)Avoid static electricity, which can damage the CMOS LSI.

防静电，静电会损坏 CMOS LSI。

(10)The polarizing plate of the display is very fragile, please handle if very carefully.

显示器的偏光板易碎，请非常小心的处理。

(11)Do not give external shock.

请勿外力摇晃

(12)Do not apply excessive force on the surface.

请勿在表面施加过大的力

(13)Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

请勿用干燥的布料擦拭偏光板，干燥的布料容易对偏光板表面造成划痕

(14)Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.

请勿使用酮类溶剂和芳香族溶剂清洁，请使用浸有清洁 naphtha 溶剂的软布进行清洁。

(15)Do not operate it above the absolute maximum rating.

请勿在超过额定电压的情况下操作

(16)Do not remove the panel or frame from the module.

请勿从模块中移除面板和框架

12.4 Warranty（担保）

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

在正常使用和存储条件下，保质期为从售出之日起的 12 个月以内。
