

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

Model NO 型号	GMT096-03-WG
Product Name 产品名称	0.96 TFT LCD Module
Version 版本号	V1
Date 日期	2022-05-17

☐ Preliminary Specification（规范草案）

☒ Final Specification（最终规格）

PREPARED 编辑	CHECKED 检查核对	APPROVED 审批人

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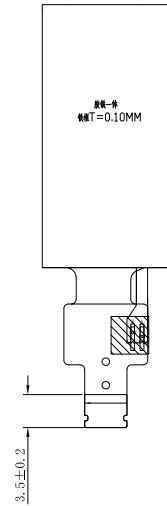
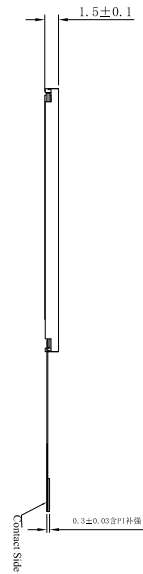
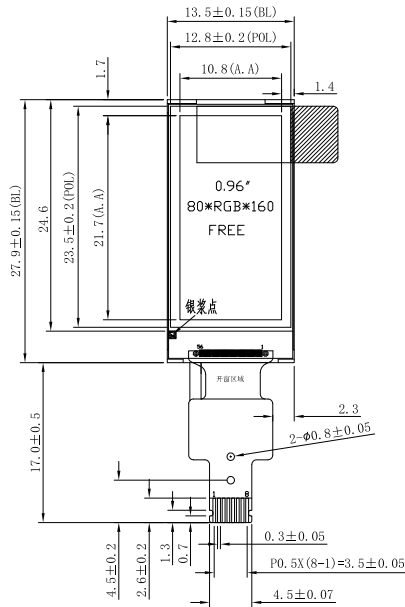
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1. General Specifications（概况）

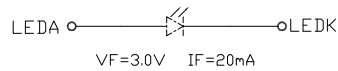
GMT096-03-WG is a 80RGBX160 dot-matrix TFT LCD module. This module is composed of a TFT LCD Panel, driver ICs, FPC and a Backlight unit.

NO.	Item	Contents	Unit
1	LCD Size	0.96inch(Diagonal)	-
2	Display Mode	Normally black	-
3	Resolution	80(H)RGB x 160(V)	-
4	Dot pitch	0.135 (H) x 0.1356(V) mm	-
5	Active area	10.8(H) x 21.7 (V) mm	-
6	Module size	13.5(H) x 27.9(V) x1.5(D) mm	-
7	Color arrangement	RGB Vtertical stripe	-
8	Interface	SPI4 LINE	-
9	Drive IC	ST7735S	-
10	Luminance(cd/m2)	260 (TYP)	
11	Viewing Direction	All View	
12	Backlight	1 White LED	
13	Operating Temp.	-20℃~ + 70℃	℃
14	Storage Temp.	-30℃~+ 80℃	℃
15	Weight	TBD	g

Item	Date	Remark
A	20191213	Original Drawing




NO	SYMBOL
1	LEDA
2	GND
3	RESET
4	RS
5	SDA
6	SCL
7	VDD
8	CS



LED CIRCUIT DIAGRAM:

NOTES:

1. DISPLAY TYPE: 0.96" TFT
2. VIEWING DIRECTION: All
3. POLARIZER MODE: TRANSMISSIVE/NORMALLY BLACK
4. DRIVER IC: ST7735S
5. OPERATING TEMP.: -20°C~70°C
6. STORAGE TEMP.: -30°C~80°C
7. BACK LIGHT: 1 CHIP-WHITE LED; 20MA,3.0V
8. LCM Luminance: 400 CD/M2(TYP)
9. UNMARKED TOLERANCE: ±0.2
10. 建议航壳开窗可视区比 LCD A.A区单边大 0.3mm
11. 产品符合ROHS标准

Customer Approval Signature	GoldenMorning Electronics Co., Ltd.							Drawing Number		Rev.	
								0.96" TFT		V1	
	Unless Otherwise Specified		Title	GMT096-03-WG				Material			
	Unit	mm						Soda Lime / Polyimide			
	General Roughness										
	Tolerance			Drawn	E.E.	Panel / E.	P.M.				
	Dimension	±0.3	By					Scale	Sheet	Size	
	Angle	±1	Date					1:1	1 of 1	A3	

3. Maximum Ratings（极限参数）

Parameter 参数	Symbol 符号	Min 最小	Max 最大	Unit 单位
Logic Supply Voltage 逻辑电源电压	IOVCC	-0.3	4.6	V
Analog Supply Voltage 模拟电源电压	VCC	-0.3	4.6	V
Operating temperature 工作温度	Top	-20	70	°C
Storage temperature 储存温度	Tst	-30	80	°C
Humidity 湿度	RH	--	90%(Max60C)	RH

4. ELECTRICAL CHARACTERISTICS（电气特性）

Parameter 参数	Symbol 符号	Min 最小	Typ 典型	Max 最大	Unit 单位
Logic Supply Voltage 逻辑电源电压	IOVCC	1.65	1.8/2.8	3.3	V
Analog Supply Voltage 模拟电源电压	VCC	2.6	2.8	3.3	--
Input Current 输入电流	Idd	--	20	--	mA

5. BACKLIGHT CHARACTERISTICS（背光特性）

Item 项目	Symbol 符号	Min 最小	Typ 典型	Max 最大	Unit 单位	Condition 条件
Forward Voltage 正向电压	Vf	3.0	3.2	3.4	V	--
Forward Current 正向电流	If	--	20	--	mA	--
Operating Life Time 使用寿命	--	--	10000	--	Hrs	

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C
(LED 电源电压由 Ta=25°C时的 LED 数量定义)

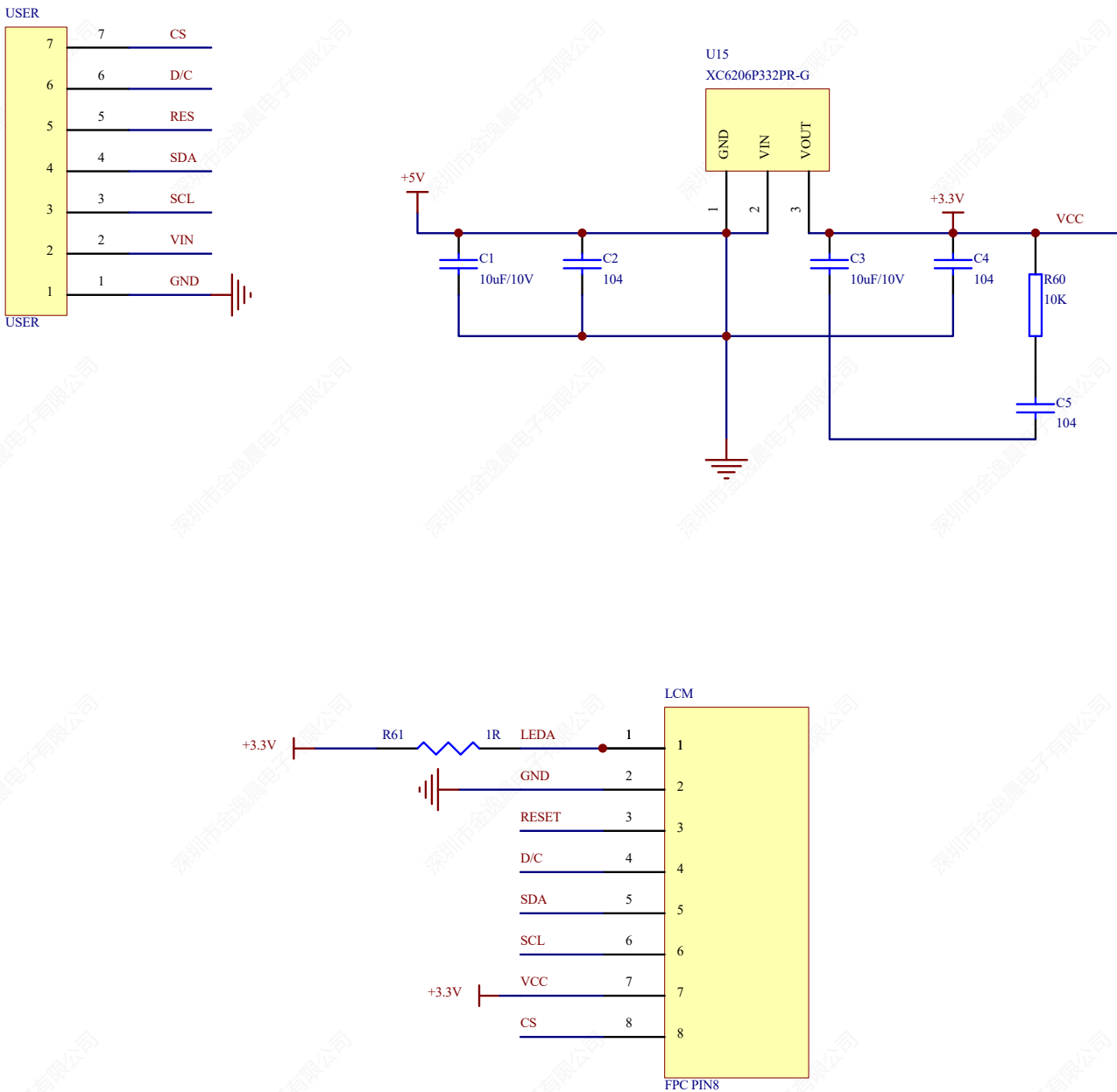
Note 2: Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.
(使用寿命意味着亮度降低到初始亮度的 50%。典型的使用寿命是估算数据。)

6. PIN DESCRIPTIONS（PIN 定义）

Pin.No 编号	Symbol 符号	Description 说明
1	LEDA	Anode of Backlight (背光正极供电脚)
2	GND	Ground (接地脚)
3	RESET	LCM Reset pin (屏复位脚)
4	D/C	Register select pin（指令/数据寄存器选择脚） D/C='1': Display data.（D/C='1':选择数据寄存器） D/C='0': Command data.（D/C='0':选择指令寄存器）
5	SDA	Serial data input (串口数据输入脚)
6	SCL	Serial clock pin. (串口时钟线)
7	VDD	Power supply for Analog（2.8V-3.3V） (系统电压)
8	CS	Chip select pin("Low" enable) (屏驱动芯片片选脚，低电平有效)

NOTE: The backlight LED can be powered separately or share a set of voltage supply with the VCC.
背光 LED 可以单独供电，也可以和 VCC 共用一组电压供电）

7. Schematic Diagram（原理图）



8. OPTICAL CHARACTERISTICS（光学特性）

Item	Symbol	Measuring Conditions		Min.	Typ.	Max.	Unit	Remark
Response Time	Tr+Tf	$\theta = 0^{\circ}$ $\phi = 0^{\circ}$	25 °C	-	30	40	ms	
Viewing Angle	θ	$\phi = 0^{\circ}$	25 °C	-	80	-	Deg	
		$\phi = 180^{\circ}$	25 °C	-	80	-		
	θ	$\phi = 90^{\circ}$	25 °C	-	80	-		
		$\phi = 270^{\circ}$	25 °C	-	80	-		
Contrast Ratio	CR	-	25 °C		800	-	-	
Color of CIE Coordinate	White	X	25 °C	0.304	0.306	0.308	-	-
		Y	25 °C	0.325	0.327	0.329		
	Red	X	25 °C	0.608	0.610	0.612		
		Y	25 °C	0.331	0.333	0.335		
	Green	X	25 °C	0.279	0.281	0.283		
		Y	25 °C	0.531	0.533	0.535		
	Blue	X	25 °C	0.144	0.146	0.148		
		Y	25 °C	0.136	0.138	0.140		
Transmittance (with polarizer)					5.09		%	

Note1:Definition of Response Time.(white-black)

The response time is defined as the time interval between the 10% and 90% amplitudes

9 Reliability（可靠性）

9.1 MTBF(平均故障间隔时间)

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.
LCD 模块的设计应满足正常情况下 50000 小时的最小 MTBF 值。

9.2 Test Condition(测试条件)

No	ITEM 测试项目	CONDITION 条件	CRITERION 标准
1	High Temperature Non-Operating Test 高温非操作试验	80℃*240Hrs	.No Defect Of Operational Function In Room Temperature Are Allowable (室温下不允许有操作功 能缺陷)
2	Low Temperature Non-Operating Test 低温非操作试验	-30℃*240Hrs	
3	High Temperature/Humidity Non Operating Test 高温/高湿非操作试验	60℃*90%RH*240Hrs	
4	High Temperature Operating Test 高温运行试验	70℃*240Hrs	.IDD of LCM in Pre-and Post-Test Should Follow Specification (LCM 在测试前和测试后 的 IDD 应遵循规范)
5	Low Temperature Operating Test 低温运行试验	-20℃*240Hrs	
6	Thermal Shock Test 热冲击试验	-20 ℃(30Min)<>70 ℃(30Min) *10CYCLES	

Notes:

- Judgments should be made after exposure in room temperature for two hours.
应在室温下暴露两小时后做出判断。
- The distill water is used for the high temperature/humidity test.
蒸馏水用于高温/湿度试验。
- The sample above is individually for every reliability tests condition.
上面的样本是针对每种可靠性测试条件单独提供的。

10. Precautions (注意事项)

10.1 Storage Conditions (储存条件)

- (1) Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $45\pm20\%\text{RH}$. (将面板或模块存放在温度为 $23\pm5^{\circ}\text{C}$ 、湿度低于 $45\pm20\%\text{RH}$ 的黑暗处)
- (2) Store in anti-static electricity container. (储存在防静电容器中)
- (3) Store in clean environment, free from dust, active gas, and solvent. (储存在清洁的环境中，没有灰尘、活性气体和溶剂)
- (4) Do not place the module near organics solvents or corrosive gases. (请勿将模块放置在有机溶剂或腐蚀性气体附近)
- (5) Do not crush, shake, or jolt the module. (请勿挤压、摇晃或震动模块)

10.2 Handling Precautions (处理注意事项)

- (1) Avoid static electricity, which can damage the CMOS LSI. (避免静电，因为静电会损坏 CMOS LSI)
 - (2) The polarizing plate of the display is very fragile, please handle if very carefully. (LCM 上的偏振片非常脆弱，请小心处理)
 - (3) Do not give external shock. (不要进行外部电击)
 - (4) Do not apply excessive force on the surface. (不要在表面上施加过大的力)
 - (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate. (不要用干布擦拭偏振片，这样很容易划伤偏振片表面)
 - (6) Do not operate it above the absolute maximum rating. (请勿在极限参数以上操作)
 - (8) Do not remove the panel or frame from the module. (请勿从模块上拆下面板或框架)
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