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DMG48320F035_01WTC
DMG48320F035_01WTCZ01
DMG48320F035_01WTCZ02

迪文科技文档 DWIN Technologies Technical Document

产品概述：

- 基于 T5L0 芯片，运行 DGUS II 系统。
- 3.5 英寸，320*480 分辨率，262K 色，IPS 屏，宽视角。
- 液晶屏与触摸屏全贴合工艺，结构可靠性高。
- 黑色、白色、一体黑触控面板，三色外观可选。
- COF 结构，智能屏的整个核心电路固定于液晶模组 FPC 上，适合结构要求轻、薄，成本要求苛刻，生产简单的应用。
- 排线共 50 个 pin 脚，引出用户 CPU 核的 IO、UART、CAN、AD、PWM 等接口，二次开发十分方便。

Features:

- **Based on T5L0, running DGUS II system.**
- **3.5 inch, 320*480 pixels resolution, 262K colors, IPS-TFT-LCD, wide viewing angle.**
- **LCD and TP full lamination process, with high structural reliability.**
- **Optional TP appearance of black, white and integrated black.**
- **COF structure. The entire core circuit of the smart screen is fixed on the FPC of LCM, featured by light and thin structure, low cost and easy production.**
- **50 pins, including IO, UART, CAN, AD and PWM from user CPU core for easy secondary development.**



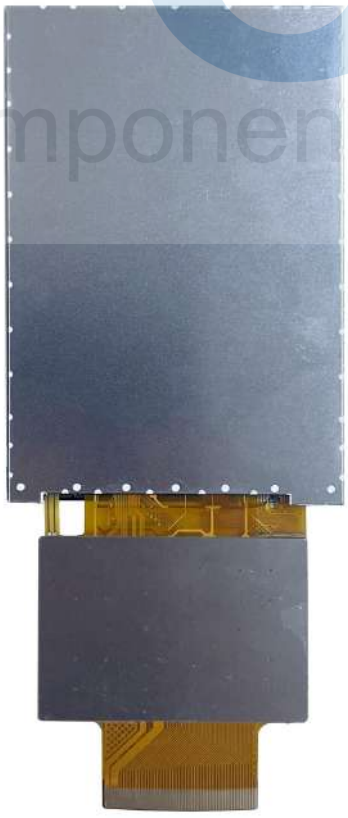
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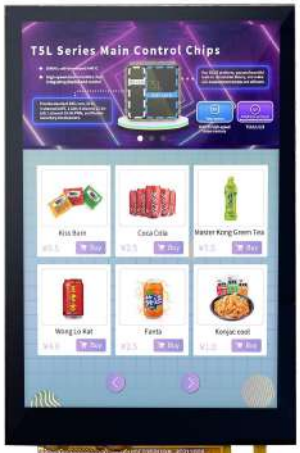


DMG48320F035_01WTCZ02



迪文科技 技术资料DWIN

1 外部接口 External Interface



用户接口 User interface

PIN 序号	Definition 定义	I/O	Functional Description 功能描述
1	+5V	I	供电输入，DC3.6-5.5V。 Power supply, DC3.6-5.5V.
2	+5V	I	
3	GND	GND	GND
4	GND	GND	
5	GND	GND	
6	AD7	I	5 路 ADC 输入，3.3V 电源做为参考，12bit 分辨率，输入电压范围 0-3.3V。除 AD6 外，其余数据通过 UART3 实时发送给 OS 核，采样速度为 16KHz。AD1 和 AD5 并联，AD3 和 AD7 并联使用，可以等效成两路 32KHz 采样 AD。AD1、AD3、AD5、AD7 并联在一起使用，可以等效成一路 64KHz 采样 AD；对数据做 1024 次累加后再除以 64，过采样获得 1 路 64Hz 16bit 的 AD 值。 5 input ADCs. 12-bit resolution in case of 3.3V power supply. 0-3.3V input voltage. Except for AD6, the rest data is sent to OS core via UART3 in real time with 16KHz sampling rate. AD1 and AD5 can be used in parallel, and AD3 and AD7 can be used in parallel, which equals to two 32KHz sampling AD. AD1, AD3, AD5, AD7 can be used in parallel, which equals to a 64KHz sampling AD; the data is summed 1024 times and then divided by 64 to obtain a 64Hz 16bit AD value by oversampling.
7	AD6	I	
8	AD5	I	
9	AD3	I	
10	AD1	I	
11	+3.3	O	3.3V 输出，最大负载 150mA。 3.3V output, maximum load of 150mA.
12	SPK	O	外接 MOSFET 驱动蜂鸣器或扬声器，外部要 10K 下拉到 GND 确保上电是低电平。 External MOSFET to drive buzzer or speaker. The external 10K resistor should be pulled down to the ground to ensure that power-on is low level.
13	SD_CD	IO	SD/SDHC 接口，SD_CK 在靠近 SD 卡接口的地方对 GND 接一个 22pF 电容。 SD/SDHC interface,The SD_CK connects a 22pF capacitor to GND near the SD card interface.
14	SD_CK	O	
15	SD_D3	IO	
16	SD_D2	IO	
17	SD_D1	IO	
18	SD_D0	IO	

19	PWM0	O	2 路 16bit PWM 输出，外部要10K 下拉到GND 确保上电是低电平。 OS 核可以通过 UART3 来实时控制。 2 16-bit PWM output. The external 10K resistor should be pulled down to the ground to ensure that power-on is low level. The OS core can be controlled in real time via UART3.
20	PWM1	O	
21	P3.3	IO	如果使用RX8130 或SD2058 I2C RTC，连接在这两个IO 上。 SCL 接P3.2，SDA 接P3.3 并10K 上拉到3.3V。 If using RX8130 or SD2058 I2C RTC to connect to both IOs, SCL should be connected to P3.2,and SDA connected to P3.3 in parallel with 10K resistor pull-up to 3.3V.
22	P3.2	IO	
23	P3.1/EX1	IO	可同时作为外部中断 1 输入，支持低电平或下跳沿中断两种模式。 It can be used as an external interrupt 1 input at the same time, and supports both low voltage level or trailing edge interrupt modes.
24	P3.0/EX0	IO	可同时作为外部中断 0 输入，支持低电平或下跳沿中断两种模式。 It can be used as an external interrupt 0 input at the same time, and supports both low voltage level or trailing edge interrupt modes.
25	P2.7	IO	IO 口 IO interface
26	P2.6	IO	IO 口 IO interface
27	P2.5	IO	IO 口 IO interface
28	P2.4	IO	IO 口 IO interface
29	P2.3	IO	IO 口 IO interface
30	P2.2	IO	IO 口 IO interface
31	P2.1	IO	IO 口 IO interface
32	P2.0	IO	IO 口 IO interface
33	P1.7	IO	IO 口 IO interface
34	P1.6	IO	IO 口 IO interface
35	P1.5	IO	IO 口 IO interface
36	P1.4	IO	IO 口 IO interface
37	P1.3	IO	IO 口 IO interface
38	P1.2	IO	IO 口 IO interface
39	P1.1	IO	IO 口 IO interface
40	P1.0	IO	IO 口 IO interface
41	UART4_TXD	O	串口 4 UART4
42	UART4_RXD	I	
43	UART5_TXD	O	串口 5 UART5
44	UART5_RXD	I	
45	P0.0	IO	IO 口 IO interface
46	P0.1	IO	IO 口 IO interface
47	CAN_TX	O	CAN 接口 CAN interface
48	CAN_RX	I	
49	UART2_TXD	O	串口 2 UART2（OS 核的UART0 串口 UART0 serial port of OS core)
50	UART2_RXD	I	

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2 规格参数 Specification Parameters

2.1 产品参数 Product Parameters

智能屏型号 Model	DMG48320F035_01WTC DMG48320F035_01WTCZ01 DMG48320F035_01WTCZ02
主控芯片 Main Chip	T5L0
用户接口方式 User Interface	50Pin_0.5mm FPC
FLASH	8M Bytes
UI 版本 UI Version	TA / DGUSII
供电方式 Power Supply	USB 供电 USB power supply
显示色彩 Display Color	262K 色 262K colors
尺寸 Dimensions	3.5 英寸 3.5 inch
分辨率 Resolution	320*480
显示尺寸（A.A） Active Area	48.96mm (W)×73.44mm (H)
可视角度 L/R/U/D Viewing Angle	宽视角，典型值 85°/85°/85°/85°（L/R/U/D） Wide viewing angel, typical value of 85°/85°/85°/85°(L/R/U/D)
背光寿命 Backlight Service Life	＞10000 小时（以最高亮度连续工作，亮度减半时间） ＞ 10000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
亮度 Brightness	DMG48320F035_01WTC:300nit DMG48320F035_01WTCZ01:300nit DMG48320F035_01WTCZ02:50nit
背光调节 Brightness Control	100 级亮度调节（当亮度调节至最高亮度的 1%~30%时，可能出现闪烁现象，不建议在此范围使用） 0~100 grade (When the brightness is adjusted to 1%~30% of the maximum brightness, flickering may occur and is not recommended to use in this range)
触摸屏类型 Type	电容式触摸屏 CTP (Capacitive Touch Panel)
触摸屏结构 Structure	G+G 结构 G+G structure
触摸方式 Touch Mode	单点触摸，支持连续滑动触摸 Support point touch and drag
表面硬度 Surface Hardness	6H
透光率 Light Transmittance	90%以上 Over 90%
触控次数 Life	>1,000,000 次 Over 1,000,000 times touch

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2.2 串口参数 Interface Parameters

参数 Item	测试条件 Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
串口波特率 Baudrate	用户自定义（硬件配置文件设置） User Set(Configure the CFG file)	3150	115200	3225600	bps
串口输出电平 Output Voltage(TXD)	Output 1	3.0	3.3	-	V
	Output 0	-	0	0.3	V
串口输入电平 Input Voltage(RXD)	Input 1	-	-	3.3	V
	Input 0	0	-	0.5	V
串口模式 Interface	UART2: TTL; UART4: TTL;（OS 配置后才能使用 Only available after OS configuration） UART5: TTL;（OS 配置后才能使用 Only available after OS configuration）				
数据格式 Data Format	UART2: N81; UART4: N81/E81/O81/N82;四种模式可选（OS 配置）4 modes (OS configuration) UART5: N81/E81/O81/N82;四种模式可选（OS 配置）4 modes (OS configuration)				

2.3 电气规格 Electrical specifications

额定功率 Rated Power	<5W	
工作电压 Operating Voltage	3.6~5.5V，典型值 5V 3.6~5.5V, typical value of 5V	
工作电流 Operating Current	165mA	VCC=5V，背光亮度最大 VCC=5V, max backlight
	70mA	VCC=5V，背光关闭 VCC=5V, backlight off
推荐工作电源：5V 1A 的直流稳压电源 Recommended power supply: 5V 1A DC		

2.4 工作环境 Operating Environment

工作温度 Operating Temperature	-10℃~60℃
存储温度 Storage Temperature	-20℃~70℃
工作湿度 Operating Humidity	10%~90%RH，典型值 60%RH 10%~90%RH, typical value of 60% RH

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3 可靠性测试 Reliability Test

智能屏产品在量产前都经过系列流程化可靠性检测，高低温、ESD、脉冲和浪涌、防水等测试，确保产品质量。

The smart screen products undergo a series of procedural reliability tests, including high and low temperature, ESD, pulse and surge, and waterproof tests before mass production to ensure product quality.

3.1 静电放电 ESD 测试 ESD Test

试验环境温度：25℃

Test temperature: 25°C

试验过程：将产品平置于测试台上，针对串口屏铁框周边和显示区域依次进行接触和空气放电，如下图 4.1 所示，实验过程观察屏幕是否出现死机、复位重启、黑屏、白屏、花屏、通信异常等工作异常现象。性能符合判据 GB/T 17626.2 B 级及以上。

Test process: the product was placed on the test bench to perform contact and air discharge in turn of the serial screen iron frame and display area as shown in Fig.4.1 below. During the experimental process, it was observed whether the screen is dead, black, white, splash, or reboot. According to the experiment results, the performance is in line with the criteria GB/T 17626.2 B level and above.



4.1 静电放电测试图

Electrostatic discharge test

放电类型 Discharge Type	放电值 Discharge Value	结果 Result
接触放电 Contact discharge	±4KV	正常工作 Normal operation
空气放电 Contact discharge	±4KV	正常工作 Normal operation

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3.2 电快速瞬变脉冲群 EFT 测试 EFT Test

试验环境温度：25℃

Test temperature: 25°C

试验过程：将产品平置于测试台上，通过脉冲群发生仪耦合脉冲群后的电源对屏幕进行供电，针对串口信号线通过脉冲群发生仪耦合脉冲群后的信号跟屏幕进行串口通信，观察屏幕是否出现复位重启、黑屏、白屏、花屏、通信异常等工作异常现象。性能符合 GB/T 17626.4 B 级及以上。

Test process: the product was placed on the test bench to perform contact and the smart screen is energized by the power supply coupled with a EFT generator as shown in Fig. 4.2 below. During the experimental process, it was observed whether abnormal reset, display or touch phenomena occurs. According to the experiment results, the performance is in line with the criteria GB/T 17626.2 B level and above.



4.2 群脉冲测试图

EFT test

测试项目 Test Item	测试标准 Test Standard	结果 Result
电源端口 Power supply	±1KV;100KHz	正常工作 Normal operation

3.3 高低温储存测试 High and Low Temperature Test

试验环境温度：-20~70℃

Test temperature:-20~70℃

试验过程：将产品斜置放在高低温测试箱内，测试时间 12H，进行 20 次开机、关机循环，自然恢复至常温后上电检查外观及功能，电容屏无偏移、跳点、乱跳和失效等问题。

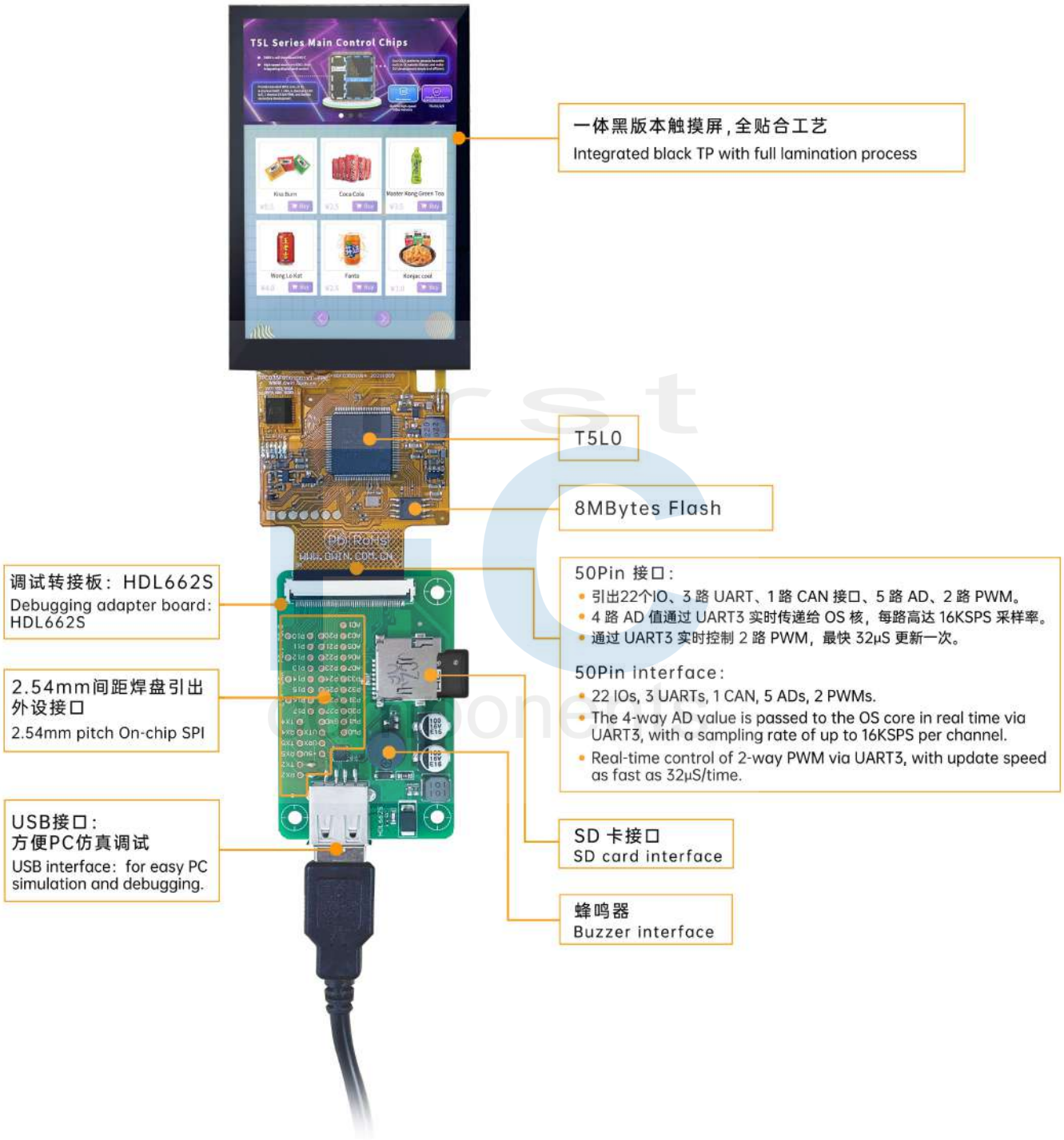
Test process: the product will be placed obliquely in the high and low temperature test chamber for 12h for 20 on and off cycles. Then it will be check at room temperature after power on for the appearance and function, CTP offset situation, jumping point, page random switching and failure.

温度 Temperature	结果 Result
高温 High temperature（70℃）	正常工作 Normal operation
低温 Low temperature（-20℃）	正常工作 Normal operation

4 调试示例 Debug

建议首次使用迪文智能屏的用户购买测试套件。详细信息可联系客服人员。

It is recommended for new users of DWIN smart LCMs to purchase official accessories. For more details, please refer to customer service center.



调试步骤：打开串口助手—自定义功能指令—设置指令—发送。

Operation steps: open serial assistant - custom function command - set command - send.

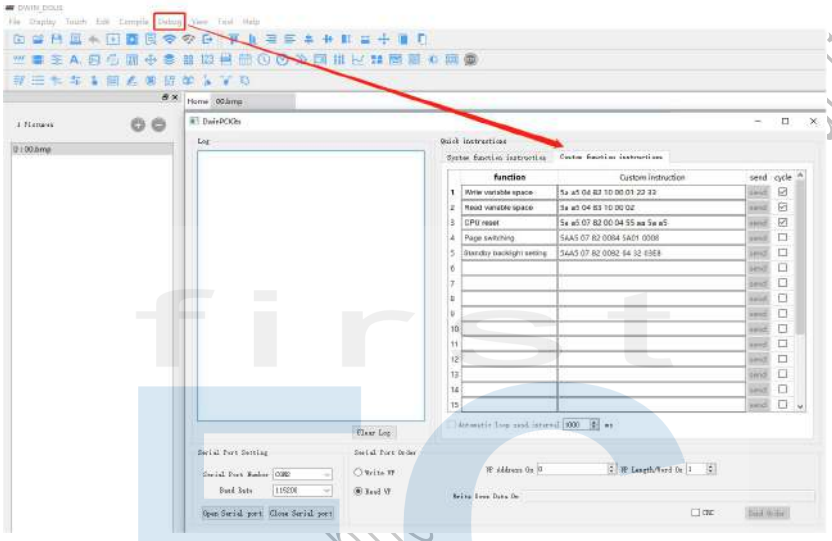
功能示例 For example:

（1）调试切页 Page switching

Tx：5AA5 07 82 0084 5A01 0008

（2）待机设置 Standby backlight setting

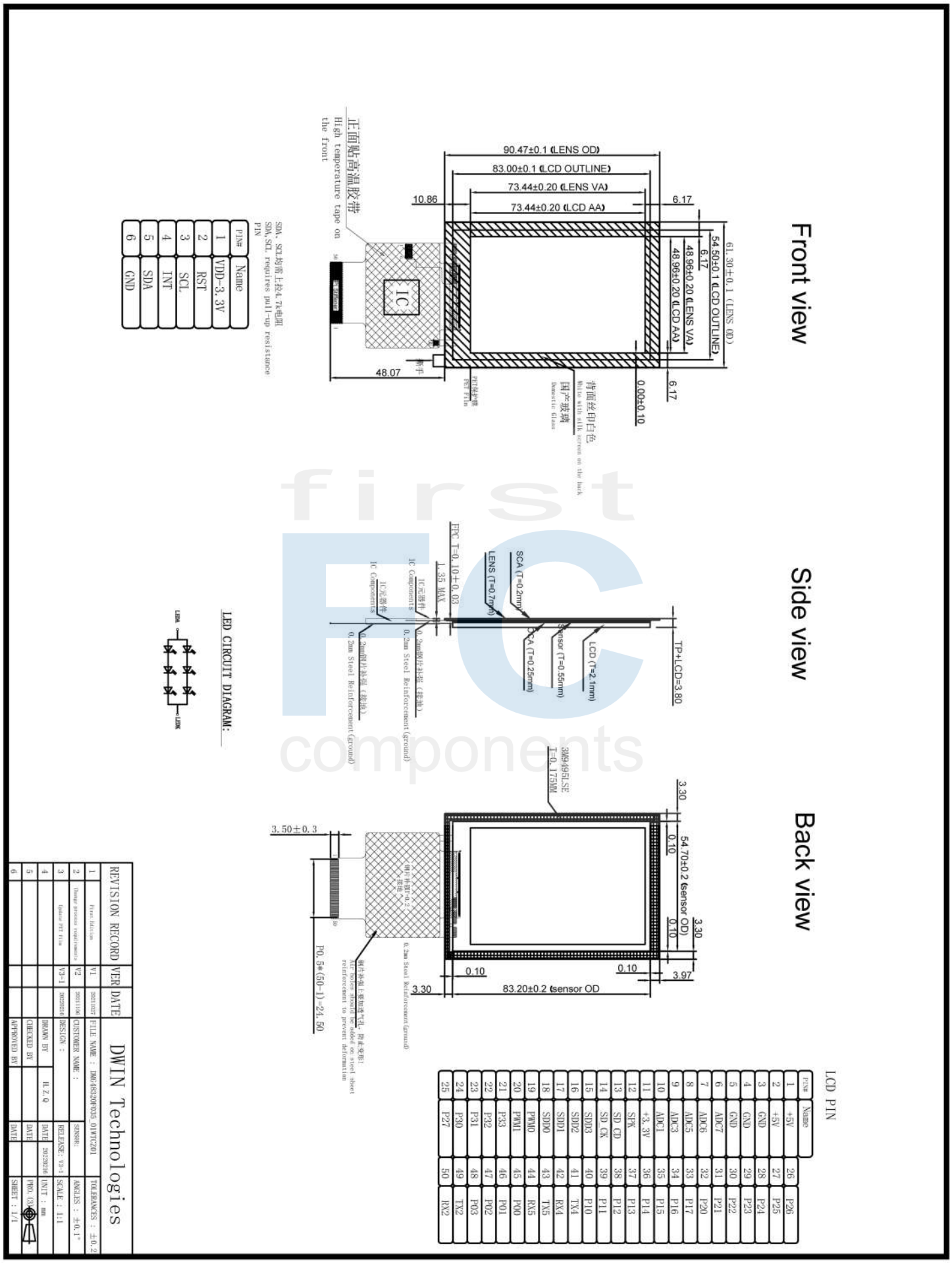
Tx：5AA5 07 82 0082 64 32 03E8



DGUS 操作图

DGUS operation

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Front view
Side view
Back view
90.47±0.1 (LENS OD)
83.00±0.1 (LCD OUTLINE)
73.44±0.20 (LENS VA)
73.44±0.20 (LCD AA)
61.30±0.1 (LENS OD)
54.50±0.1 (LCD OUTLINE)
48.96±0.20 (LENS VA)
48.96±0.20 (LCD AA)
10.86
6.17
48.07
0.00±0.10
正面贴高温胶带
High temperature tape on the front
背面丝印白色
White silk screen on the back
国产玻璃
Domestic Glass
FPC Pin
FPC T=0.10±0.03
1.35 MAX
SCA (T=0.2mm)
LENS (T=0.7mm)
SCA (T=0.25mm)
Sensor (T=0.55mm)
LCD (T=2.1mm)
TP+LCD=3.80
IC元器件
IC Components
0.2mm Steel Reinforcement (ground)
3M9495LSE
T=0.175MM
3.30
54.70±0.2 (sensor OD)
0.10
3.97
83.20±0.2 (sensor OD
3.50±0.3
P0.5*(50-1)=24.50
PIN#
Name
1 VDD-3.3V
2 RST
3 SCL
4 INT
5 SDA
6 GND
SDA、SCL均需上拉4.7K电阻
SDA, SCL requires pull-up resistance
LED CIRCUIT DIAGRAM:
LEDA
LEDK
LCD PIN
1 +5V
2 +5V
3 GND
4 GND
5 GND
6 ADC7
7 ADC6
8 ADC5
9 ADC3
10 ADC1
11 +3.3V
12 SPK
13 SD_CD
14 SD_CK
15 SDD3
16 SDD2
17 SDD1
18 SDD0
19 PWM0
20 PWM1
21 P33
22 P32
23 P31
24 P30
25 P27
26 P26
27 P25
28 P24
29 P23
30 P22
31 P21
32 P20
33 P17
34 P16
35 P15
36 P14
37 P13
38 P12
39 P11
40 P10
41 TX4
42 RX4
43 TX5
44 RX5
45 P00
46 P01
47 P02
48 P03
49 TX2
50 RX2
REVISION RECORD
VER
DATE
DWIN Technologies
FILE NAME : DMG48320F035_01WTCZ01
CUSTOMER NAME :
SENSOR:
DESIGN :
RELEASE: V3-1
DRAWN BY
CHECKED BY
APPROVED BY
SCALE : 1:1
UNIT : mm
SHEET : 1/1
TOLERANCES : ±0.2
ANGLES : ±0.1°

5 修订记录 Record of Revision

版本 Rev	日期 Date	描述 Content	编辑人 Editor
00	2021-10-27	首次发布 First Edition	欧阳开杏
01	2021-11-17	更新尺寸图 Update Dimension	欧阳开杏
02	2022-02-23	更新实物图 Update physical picture	欧阳开杏
03	2022-03-02	更新尺寸图 Update Dimension	欧阳开杏
04	2022-06-14	更新工作电压 Update Operating Voltage	欧阳开杏
05	2022-10-28	更新亮度 Update Brightness	欧阳开杏
06	2022-11-17	修改尺寸说明 Modify dimension description	欧阳开杏

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