

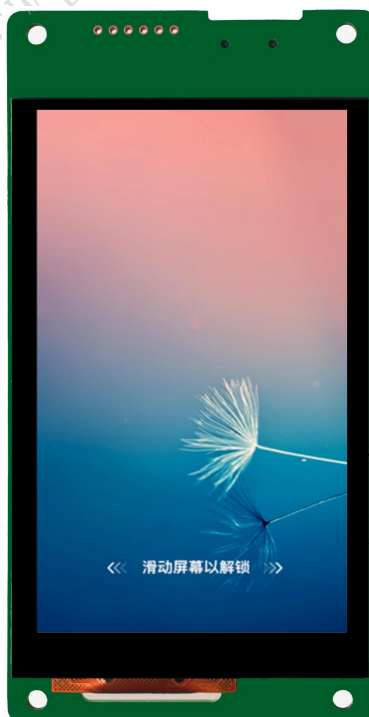
DMG80480C040_03WTC

产品特点:

- (1) 基于 T5L1 ASIC CPU, 运行 DGUSII 人机交互软件平台, 商业级应用的智能屏。
- (2) 4.0 英寸, 480*800 分辨率, 16.7M 种颜色真彩显示, IPS 液晶显示屏。
- (3) 适用于常见商业环境的高可靠性电容触摸屏。

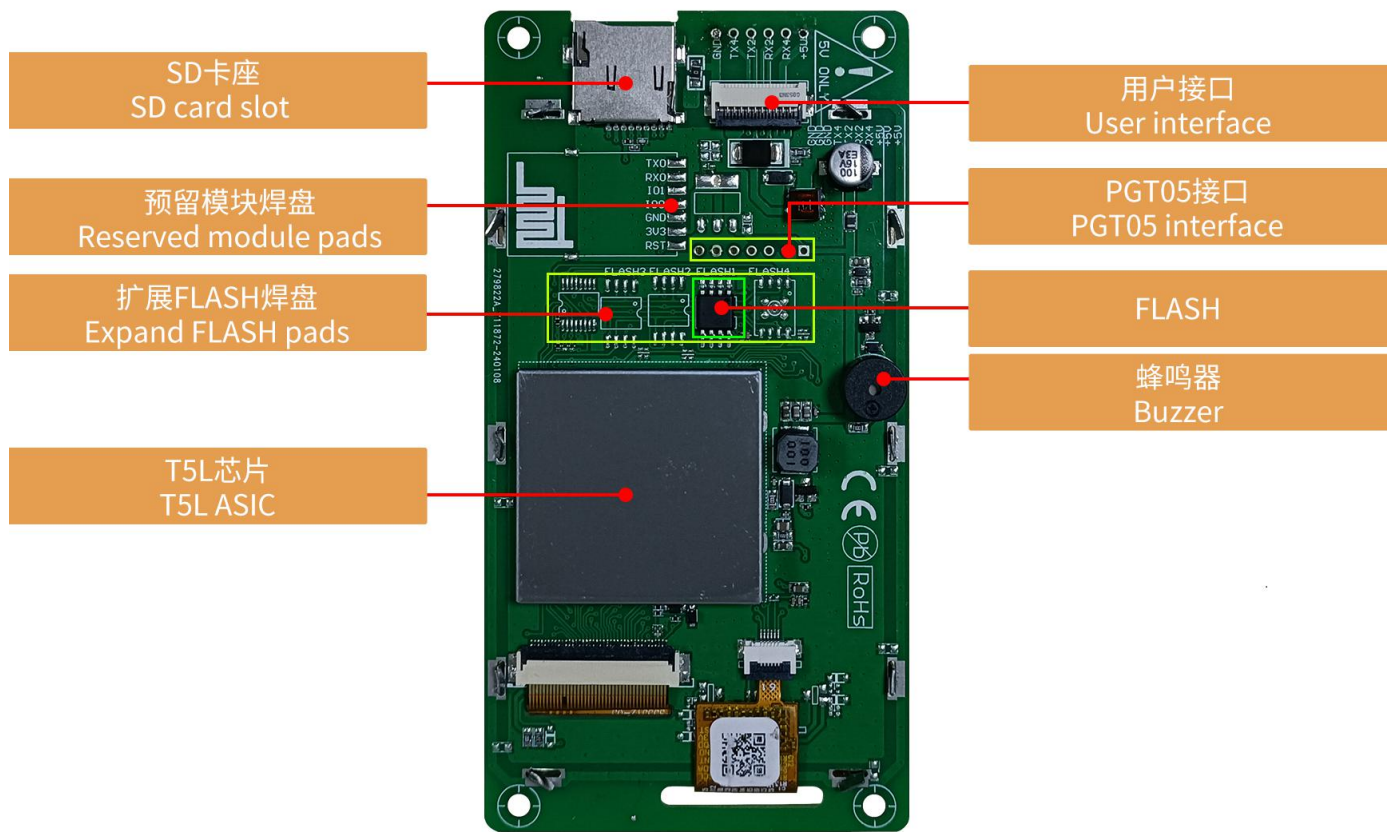
Features:

- (1) Based on the T5L1 ASIC CPU, running the DGUSII human-machine interaction software platform, smart LCM for commercial-grade applications.
- (2) 4.0-inch, 480*800 resolution, 16.7M colors true-color display, IPS LCD screen.
- (3) High-reliability capacitive touch panel suitable for commercial environments.



1、硬件及接口 Hardware and interface

1.1 硬件接口图 Hardware interface



硬件接口图
Hardware interface

1.2 硬件及接口说明 Hardware and interface description

序号 No.	名称 Name	说明 Description
1	T5L1 芯片 T5L1 ASIC	迪文自主研发，2019 年量产；专利加密技术，确保代码和数据安全；功耗低，抗干扰能力强，双面 PCB 设计上轻松通过 EMC/EMI 测试。 DWIN independently developed, mass production in 2019; patented encryption technology ensures code and data security; low power consumption, strong anti-interference capability, easily passes EMC/EMI tests with dual-sided PCB design.
2	用户接口 User interface	用于供电和串口通讯，10Pin_1.0mm 带锁扣座子。 串口下载速率（典型值）：12KByte/s。 10Pin_1.0mm latching socket for power supply and serial communication. Download rate(typical value): 12KByte/s.
3	Flash	16MBytes NOR Flash，可用于存放字库、图片、音乐等用户 UI 文件，擦写次数>100,000 次。 16MBytes NOR Flash, can be used to store user UI files such as fonts, images, music, etc., with erase/write cycle >100,000 times.
4	扩展 Flash 焊盘 Expand Flash pads	有 3 个扩展位，支持扩展 NOR Flash、NAND Flash。 NOR Flash 最大可拓展到 64Mbytes。 NOR Flash 与 NAND Flash 组合最大可拓展到 48Mbytes（2 个扩展位）+512Mbytes。 Flash 扩展时需焊接译码器、电容等元器件。相关定制可咨询对应业务员。 Three expansion slots are available, supporting expansion of NOR Flash and NAND Flash. The maximum expansion for NOR Flash is up to 64Mbytes. When combining NOR Flash and NAND Flash, the maximum expansion is up to 48Mbytes (using two expansion slots) + 512Mbytes. When expanding Flash, components such as decoders and capacitors need to be soldered. Please consult the corresponding salesperson for relevant customization.
5	蜂鸣器 Buzzer	3V 无源蜂鸣器。 3V passive buzzer.
6	SD 卡座 SD card slot	支持所有文件（用户 UI 文件、CFG 硬件配置文件、底层内核固件）下载，屏幕显示下载统计信息，下载速率：4Mb/s。下载文件时，SD 卡需格式化为 FAT32 格式，推荐块大小为 4096。 Supports downloading of all files (user UI files, CFG files, underlying kernel firmware), displays download statistics on the screen, download rate: 4 Mb/s. When downloading files, the SD card needs to be formatted in FAT32 format, with a recommended allocation unit size of 4096.
7	预留模块接口 Reserved module interface	支持焊接 WI-FI 模块、USB 下载模块。 WI-FI 模块型号：WI-FI-10；USB 模块型号：HDL702、HDL703。 Supports soldering of WI-FI module and USB download module. WI-FI module model: WI-FI-10; USB module models: HDL702, HDL703.
8	PGT05 接口 PGT05 interface	用于重新烧录 DGUS 底层程序。 Used for reprogramming the underlying DGUS firmware.

2、规格参数 Specification parameters

2.1 显示参数 Display parameters

显示屏类型 LCD Type	IPS 工艺 TFT 显示屏。 IPS process TFT display screen.
视角 Viewing Angle	视角宽（典型值是 85°/85°/85°/85°），对比度高、色彩还原好。 Wide viewing angle (typical values are 85°/85°/85°/85°), high contrast, and good color reproduction.
分辨率 Resolution	480×800（支持 0°/90°/180°/270°显示模式） 480×800 pixels (support 0°/90°/180°/270°)
色彩 Color	16.7M 色（24 位 8R8G8B） 16.7M color (24-bit 8R8G8B)
AA 区 Active Area (A.A.)	51.4mm (W)×86.0mm (H)
VA 区 View Area (V.A.)	51.8mm (W)×86.4mm (H)
接口 Interface	RGB
背光模式 Backlight Mode	LED
背光寿命 Backlight Service Life	>20000 小时（以最高亮度连续工作，亮度减半时间） >20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
背光亮度 Brightness	400nit
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)
注：长时间固定画面显示可能导致屏幕残影，可以用动态图片切换做屏保解决。 Note: You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time.	

2.2 触摸参数 Touch parameters

触摸屏类型 Type	电容式触摸面板。 Capacitive touch panel.
接口 Interface	I ² C
触摸屏结构 Structure	G+G 结构，表面盖板为钢化玻璃。 G+G structure with surface cover of tempered glass.
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%

触控次数 Life	>1,000,000 次。 Over 1,000,000 times touch.
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2.3 串口参数 Serial interface parameters

串口模式 Mode	UART2: TTL/CMOS UART4: TTL/CMOS (OS 配置后才能使用 Only available after OS configuration)				
串口电平 Voltage Level	测试条件 Test Condition	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
	Output 1, Iout = 1mA	3.0	3.3	-	V
	Output 0, Iout = -1mA	-	0	0.3	V
	Input 1, Iin = 1mA	2.4	3.3	5.0	V
	Input 0, Iin = -1mA	0	-	0.5	V
串口波特率 Baud Rate	3150~3225600bps, 典型值: 115200bps。 3150~3225600bps, typical value of 115200bps.				
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)				
接口排线 Interface Cable	10Pin_1.0mm				

2.4 电气规格 Electrical specifications

额定功率 Rated Power	<5W	
工作电压 Operating Voltage	4.5~5.5V, 典型值 5V。 4.5~5.5V, typical value of 5V.	
工作电流 Operating Current	320mA	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.		

2.5 工作环境 Operating environment

工作温度 Operating Temperature	-20℃~70℃ (5V @ 60% RH)
存储温度 Storage Temperature	-30℃~80℃
三防漆工艺 Conformal coating	无 None
工作湿度 Operating Humidity	10%~90%RH, 典型值 60%RH。 10%~90%RH, typical value of 60% RH.

3、可靠性测试 Reliability test

3.1 静电放电测试 Electrostatic discharge test

测试环境温度：25°C，测试环境湿度：50%RH。

Test temperature: 25°C. Test humidity: 50%RH.

试验过程：将产品平置于测试台上，针对串口屏显示区域进行空气放电；实验过程观察屏幕有无死机、黑屏、白屏、花屏、重启等异常现象。性能符合判据 GB/T 17626.2 B 级及以上。

Test process: Place the product flat on the test bench and perform air discharge on the display area of the serial port screen. 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.

■ Test standard : ☐ EN 61000-4-2:2009 ☒ IEC 61000-4-2:2008 ☐ GB/T 17626.2-2018
☐ Other:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-8kV	+8kV	-15kV	+15kV
屏幕					A	A		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV
边框					B	B		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

性能标准：

- A.在制造商、委托方或购买方规定的限值内性能正常；
- B.功能或性能暂时丧失或降低，但在骚扰停止后能自行恢复，不需要操作者干预；
- C.功能或性能暂时丧失或降低，但需操作者干预才能恢复；
- D.因设备硬件或软件损坏，或数据丢失而造成不能恢复的功能丧失或性能降低。

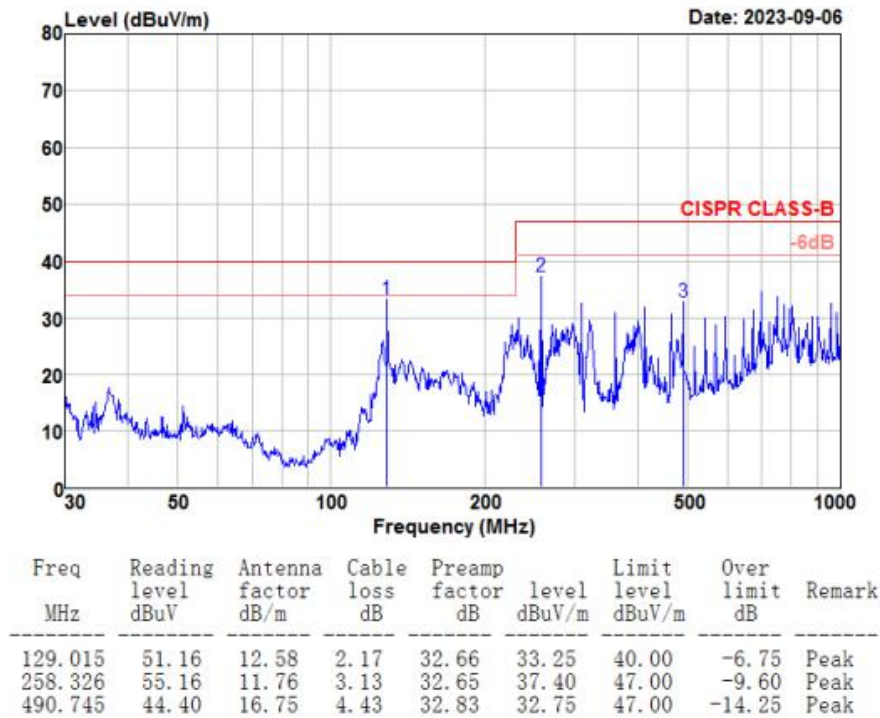
Performance Criterion:

- A. Normal performance within limits specified by the manufacturer, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- D. Loss of function or degradation of performance which is not recoverable, due to damage to hardware or software, or loss of data.

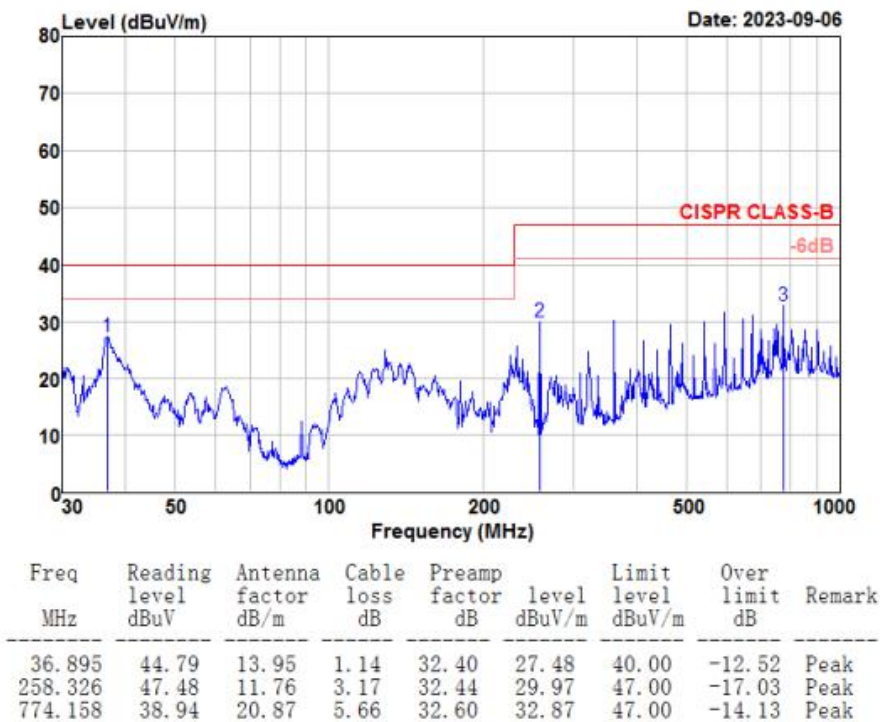
3.2 辐射干扰测试 RE test

测试项目 Test Item	测试标准 Test Standard	结果 Result
辐射干扰 RE	Class B	正常工作 Normal operation

HORIZONTAL



VERTICAL



4、包装和物理尺寸 Packaging & dimensions

外形尺寸 Form Factor	61.8mm (W)×119.5mm (H)×12.8mm (T)			
安装尺寸 Installation Dimensions	开孔尺寸：58.2（+0.3mm）×95.5（+0.3mm） Positioning hole: 58.2(+0.3mm)×95.5(+0.3mm)			
净重量 Net Weight	85g			
包装标准 Packaging Standards				
包装箱型号 Model	包装箱尺寸 Dimensions	层数（层） Layer	数量/层（片） Quantity/Layer	总数量（片） Quantity(Pcs)
1 号箱 Carton1:	220mm(L)×160mm(W)×47mm (H)	1	2	2
2 号箱 Carton2:	250mm(L)×200mm(W)×80mm (H)	2	2	4
3 号箱 Carton3:	320mm(L)×270mm(W)×80mm (H)	2	4	8
4 号箱 Carton4:	435mm(L)×335mm(W)×290mm(H)	2	25	50
5 号箱 Carton5:	600mm(L)×430mm(W)×290mm(H)	2	75	150

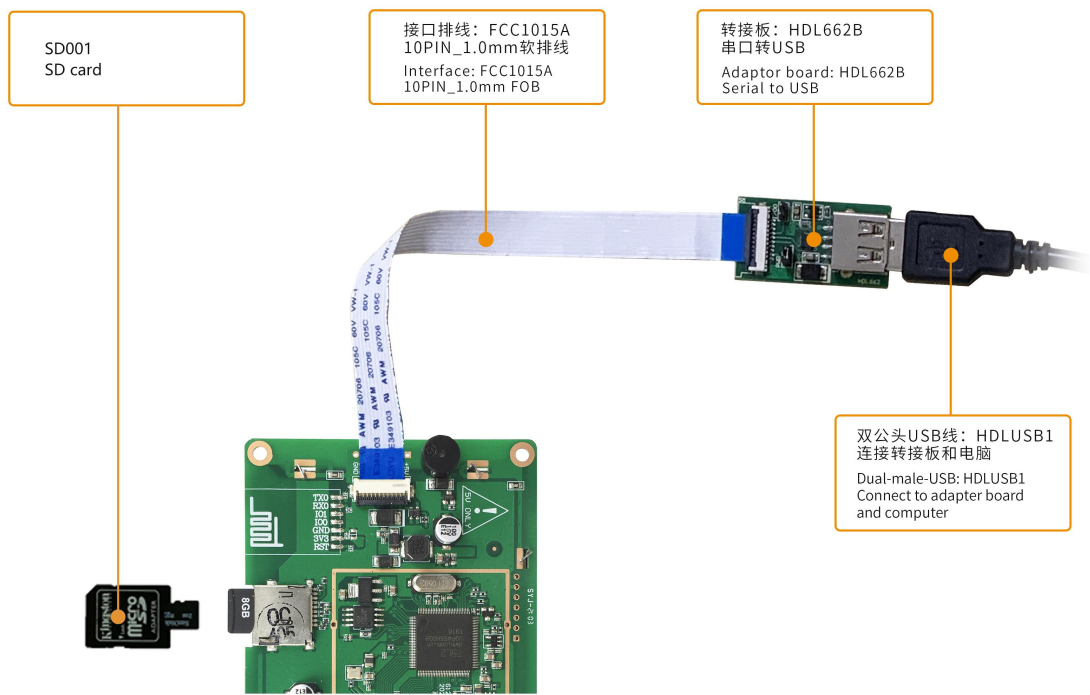
声明：产品设计改善或变更，不单独另行通知。

Disclaimer: The product design is subject to alternation and improvement without prior notice.

5、调试工具 Debugging tools

建议首次使用迪文智能屏的用户购买标准配件。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.



6、T5L 系列芯片特点 T5L series IC features

(1) 采用应用最广泛、成熟和稳定的 8051 核，1T（单指令周期）高速工作，最高主频 250MHz。

Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 250MHz, 1T(single instruction cycle)high speed operation.

(2) 单独 CPU 核（GUI CPU）运行 DGUS II 系统：

Separate GUI CPU Core running DGUS II System:

- 内置高速显存，2.4GB/S 带宽。

High-speed display memory, 2.4GB/S bandwidth.

- 2D 硬件加速，JPEG 解压缩速度高达 200fps@1280*800，UI 极其流畅。

2D hardware acceleration, the decompression speed of JPEG is up to 200fps@1280*800 and the UI with animation and icons as its main feature is extremely cool and smooth.

- JPEG 压缩模式存储图片、图标，大幅度缩小外置存储器到低成本的 16Mbytes SPI Flash。

Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.

- 支持电阻或电容触摸屏，灵敏度可以调节，最快 400Hz 触控打点速度。

Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.

- 1 路 15bit 32Ksps PWM 数字功放驱动扬声器，实现高品质语音压缩存储和播放。

1-way 15bit 32Ksps PWM digital power amplifier driver loudspeaker, save power amplifier cost and achieve high signal-to-noise ratio and sound quality restoration.

- 128Kbytes 变量存储器空间，存储器接口和 OS CPU 核交换数据，应用及其简单。

128Kbytes variable storage space for exchanging data with OS CPU Core and memory.

- 支持 PC 端组态开发和仿真，支持后台远程升级。

Support DGUS development and simulation on PC. Support background remote upgrade.

(3) 单独 CPU 核（OS CPU）运行用户 8051 代码，应用中省掉用户 CPU：

Separate CPU (OS CPU) core runs user 8051 code or DWIN OS system and user CPU is omitted in practical application:

- 标准 8051 架构和指令集，64Kbytes 代码空间，32Kbytes 片内 RAM。

Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.

- 64bit 整数型数学运算单元（MDU），包括 64bit MAC 和 64bit 除法器。

64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.

- 28 个 IO，4 路 UARTs，1 路 CAN 接口，最多 8 路 12bit A/D，2 路 16bit 分辨率可调的 PWM。

28 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channle 16-bit PWM of adjustable resolution.

- 支持 IAP 在线仿真和调试，断点数量无限制。

Support IAP on-line simulation and debugging with unlimited number of breakpoints.

- 可以透过 DGUS 系统在线升级代码。

Upgrade code online through DGUS system.

- (4) 1Mbytes 片内 Flash, 迪文专利加密技术, 确保代码和数据安全, 杜绝山寨和克隆。

1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.

- (5) $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ 工作温度范围 (可定制 $-55^{\circ}\text{C} \sim 105^{\circ}\text{C}$ 工作温度范围 IC)。

Operating temperature ranges from -40°C to $+85^{\circ}\text{C}$ (IC operating temperature customizable from -55°C to 105°C).

迪文欢迎广大用户基于 T5L 自主设计客制化产品。

DWIN encourages users to design your own customized product based on T5L.



7、修订记录 Revision records

版本 Rev	日期 Revise Date	描述 Content	编辑人 Editor
00	2019-03-29	首次发布 First Edition	质控部
01	2021-07-16	更新实物图 Update physical drawing	郑运佳
02	2021-11-05	升级版本 Upgrade version	郑运佳
03	2022-11-14	修改尺寸说明 Modify dimension description	郑运佳
04	2023-08-16	PCB 厚度变更，整体 CAD 修订 PCB thickness change, overall CAD revision	郑运佳
05	2023-10-19	产品优化升级，老产品功能不受影响，新产品自然替代，实物图为最新产品图 Product optimization and upgrading, old product functions are not affected, and new products are naturally replaced, and the physical image is the latest product image	郑运佳
06	2024-01-24	EMC 硬件升级，库存旧板自然消耗 EMC hardware upgrade, natural consumption of old inventory boards	赵方维

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客服邮箱 Customer service email: dwinhmi@dwin.com.cn

迪文开发者论坛 DWIN Developer Forum: <http://inforum.dwin.com.cn:20080/forum.php>

感谢大家一直以来对迪文的支持，您的支持是我们进步的动力！

Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!