AGM-040A1-I1R

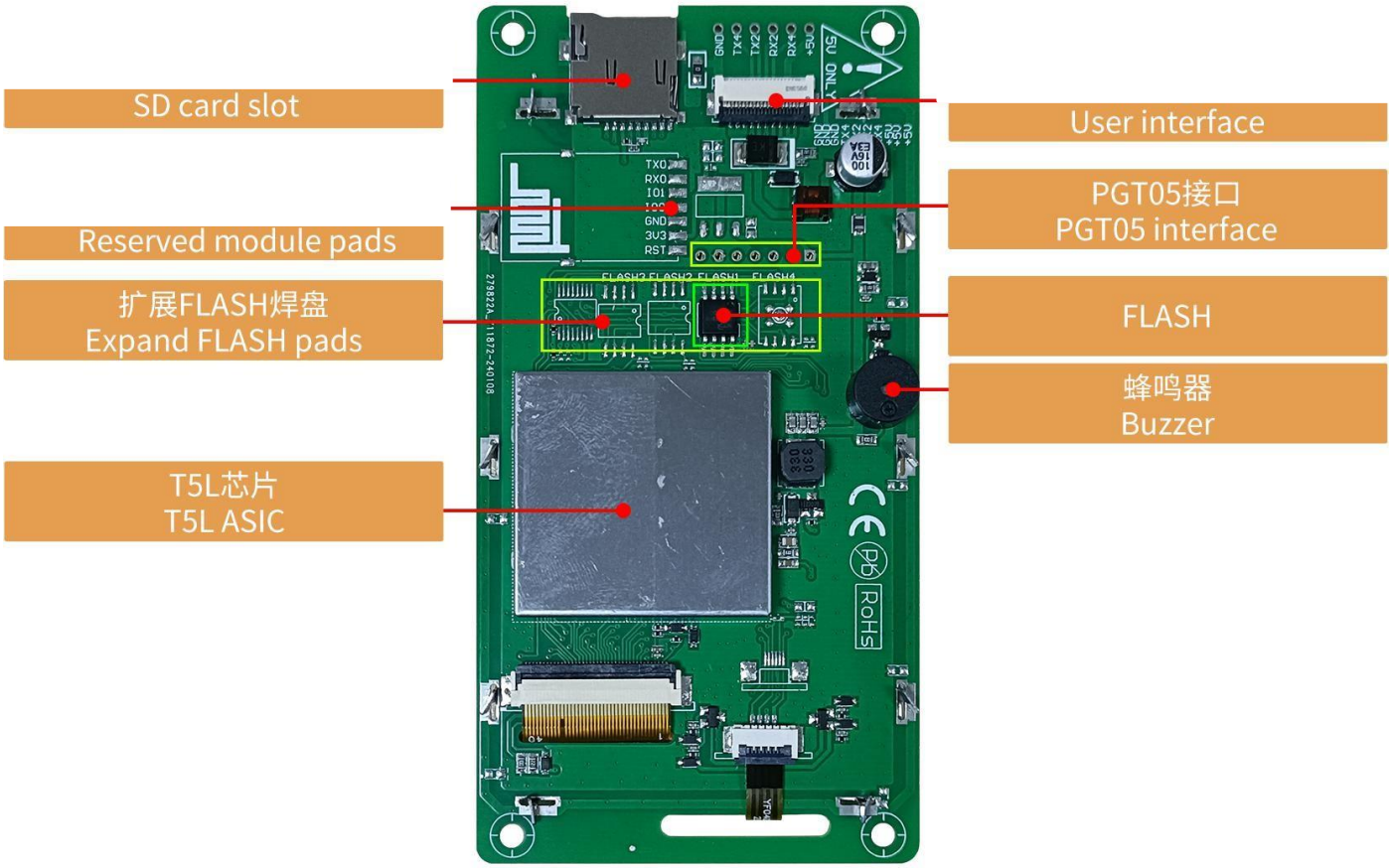
Features:

(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 resistive touch panel suitable for commercial environments.

1、Hardware and interface



Hardware interface

1.1 Hardware and interface description

No.	Name	Description
1	T5L1 ASIC	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	User interface	10Pin_1.0mm latching socket for power supply and serial communication. Download rate(typical value): 12KByte/s.
3	Flash	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	Expand Flash pads	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	Buzzer	3V passive buzzer.
6	SD card slot	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	Reserved module interface	Supports soldering of WI-FI module and USB download module. WI-FI module model: WI-FI-10; USB module models: HDL702, HDL703.
8	PGT05 interface	Used for reprogramming the underlying DGUS firmware.

2. Display parameters

LCD Type	IPS process TFT display screen.
Viewing Angle	Wide viewing angle (typical values are 85°/85°/85°/85°), high contrast, and good color reproduction.
Resolution	480×800 pixels (support 0°/90°/180°/270°)
Color	16.7M color (24-bit 8R8G8B)
Active Area (A.A.)	51.4mm (W)×86.0mm (H)
View Area (V.A.)	51.0mm (W)×86.0mm (H)
Interface	RGB
Backlight Mode	LED
Backlight Service Life	>20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
Brightness	300nit
Brightness Control	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)
Note: You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time.	

2.1 Touch parameters

Type	Resistive touch panel.
Structure	ITO film + ITO glass.
Touch Mode	Support point touch and drag.
Surface Hardness	3H
Light Transmittance	>80%
触控次数 **Life**	Over 1,000,000 times touch.

2.2 Serial interface parameters

Mode	UART2: TTL/CMOS UART4: TTL/CMOS (OS Only available after OS configuration)				
Voltage Level	Test Condition	Min	Typ	Max	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
Baud Rate	3150~3225600bps, typical value of 115200bps.				
Data Format	UART2: N81 UART4: N81/E81/O81/N82）4 modes (OS configuration)				
Interface Cable	10Pin_1.0mm				

2.3 Electrical specifications

Rated Power	<5W	
Operating Voltage	4.5~5.5V, typical value of 5V.	
Operating Current	240mA	VCC=5V, max backlight.
	70mA	VCC=5V, backlight off.
Recommended power supply: 5V 1A DC.		

2.4 Operating environment

Operating Temperature	-20℃~70℃ (5V @ 60% RH)
Storage Temperature	-30℃~80℃
Conformal coating	None
Operating Humidity	10%~90%RH, typical value of 60% RH.

3、Reliability test

3.1 Electrostatic discharge test

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

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
					A	A		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

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

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;

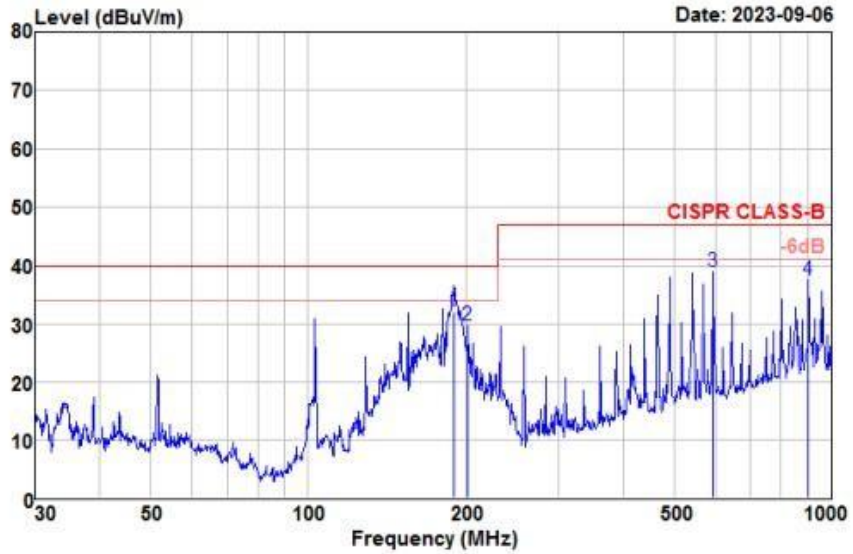
C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;

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 RE test

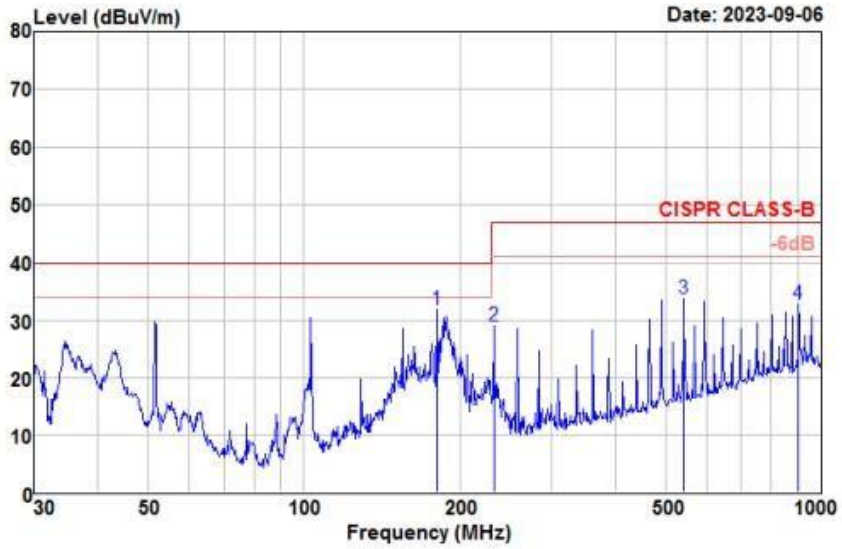
Test Item	Test Standard	Result
RE	Class B	Normal operation

HORIZONTAL



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
189.739	51.00	11.18	2.67	32.67	32.18	40.00	-7.82	QP
202.100	49.58	10.16	2.74	32.67	29.81	40.00	-10.19	Peak
595.133	47.94	18.77	4.93	32.76	38.88	47.00	-8.12	Peak
903.309	41.34	21.96	6.27	32.07	37.50	47.00	-9.50	Peak

VERTICAL



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
180.649	49.52	12.36	2.56	32.67	31.77	40.00	-8.23	Peak
232.532	47.27	11.51	2.96	32.66	29.08	47.00	-17.92	Peak
543.274	44.30	17.53	4.70	32.81	33.72	47.00	-13.28	Peak
903.309	36.72	21.96	6.27	32.07	32.88	47.00	-14.12	Peak

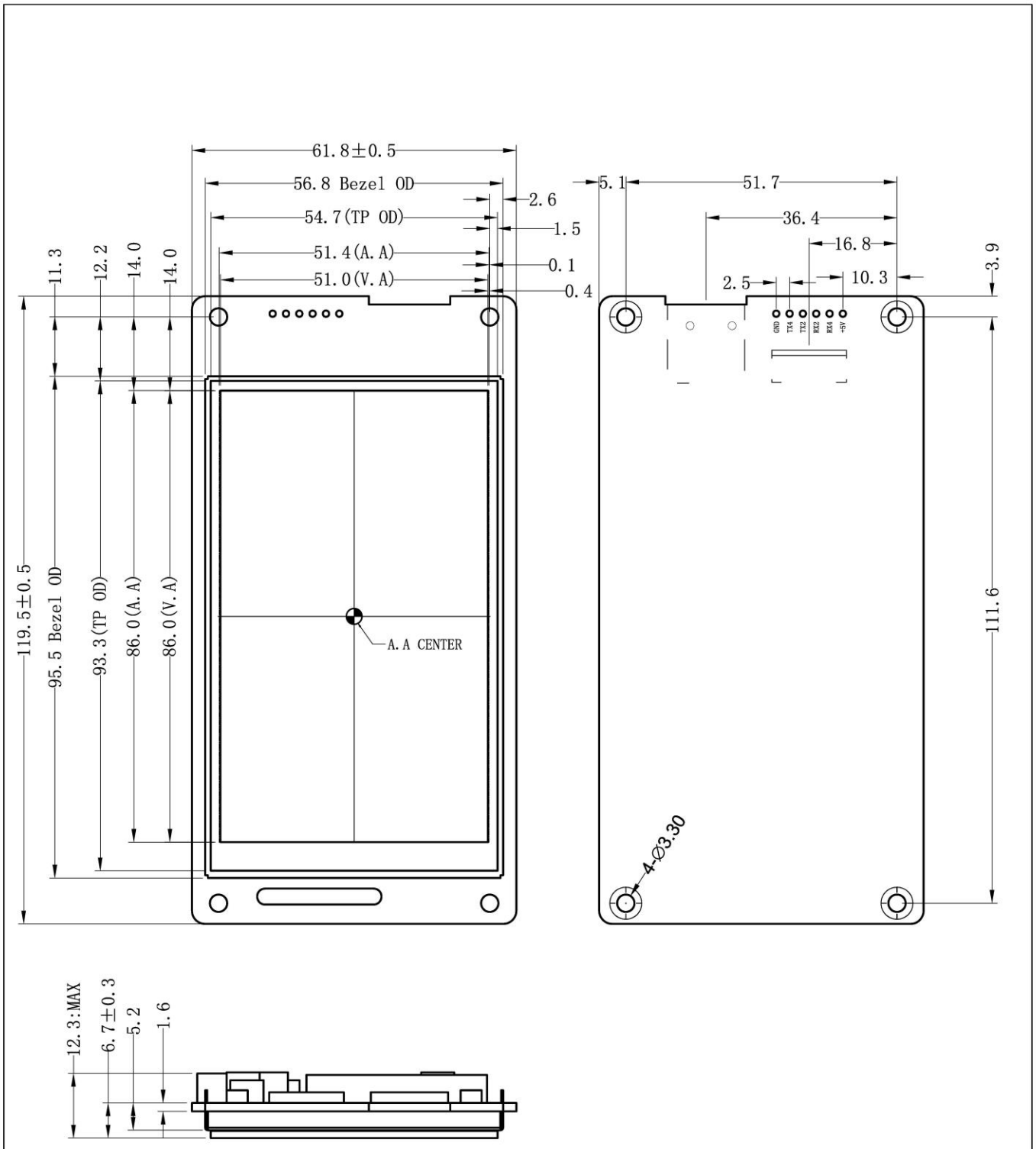
4、Packaging & dimensions

Form Factor	61.8mm (W)×119.5mm (H)×12.3mm (T)
Installation Dimensions	Positioning hole: 56.8(+0.3mm)×95.5(+0.3mm)
Net Weight	80g

Packaging Standards

Model	Dimensions	Layer	Quantity/Layer	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

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



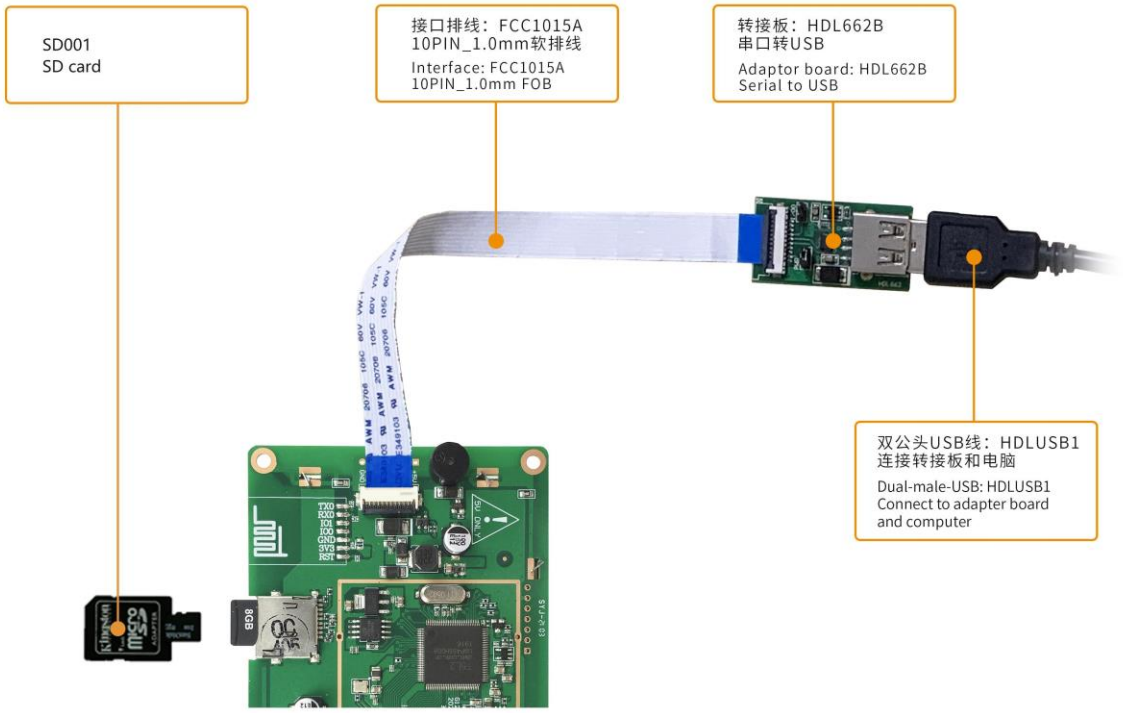
1.
Location hole is used as position reference.
2.
Unmarked Tolerance is +/-0.3mm
Active area is marked in Dash lines

Definition	Pin#	Type
GND	8, 9, 10	P
TX4	7	O
TX2	6	O
RX2	5	I
RX4	4	I
+5V	1, 2, 3	P

型号 Model					
图纸 Drawing	A 4	绘制 Drawn	DWIN	日期 Date	
比例 Scale		审核 Review		日期 Date	
单位 Unit	MM	批准 Approval		日期 Date	

5 Debugging tools

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 series IC features

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.

Separate GUI CPU Core running DGUS II System:

- ，2.4GB/S

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

- 2D 200fps@1280*800，UI。

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

- 400Hz。

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

- 15bit 32Ksps PWM

  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 OS CPU

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

- PC

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

（2） CPU（OS CPU）8051 CPU：

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

- 8051，64Kbytes，32Kbytes RAM。

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

- 64bit（MDU），64bit MAC 64bit

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

- 28 个 IO，4 UARTs，1 CAN 8 12bit A/D，2 16bit 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.

- IAP。

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

  .

- DGUS

  Upgrade code online through DGUS system.

（4）1Mbytes Flash，

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

（5）-40℃~+85℃ -55℃~105 IC）。

Operating temperature ranges from -40℃ to +85℃(IC operating temperature customizable from -55℃ to 105℃).

7、Revision records

Rev	Revise Date	Content	Editor
00	2019-03-29	First Edition	
01	2021-07-16	Update physical drawing	
02	2021-11-05	Upgrade version	
03	2022-11-14	Modify dimension description	
04	2023-08-16	PCB thickness change, overall CAD revision	
05	2023-10-19	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	
06	2024-01-24	EMC hardware upgrade, natural consumption of old inventory boards	