DMG40400C016_13WNZ154

Features:

- **Powered by T5L0-Q88 ASIC, running DGUS II HMI platform.**
- **1.6-inch, 400*400 resolution, IPS-TFT LCD.**
- **Circular rotary screen with encoder shell.**

1.1 Hardware and interface description

No.	Name	Description
1	T5L0-Q88 ASIC	DWIN independently developed, mass production in 2023. Dual 8051 cores,GUI and application run on separate 8051 cores.
2	User interface	6Pin_2.0mm socket for power supply and serial communication.
3	USB interface	MICRO USB, power supply interface (5V)
4	Flash	16MBytes NOR Flash, can be used to store user UI files such as fonts, images, music, etc., with erase/write cycles >100,000 times
5	SD card interface	FPC8_ 0.5mm interface, no SD card slot, download requires an external adapter board 130-SDK. FAT32 format, download files, files can be displayed in screen statistics, download speed: 4Mb/s
6	PGT05 interface	Used for reprogramming the underlying DGUS firmware

2.Specification parameters

2.1 Display parameters

LCD Type	IPS, TFT LCD.
Viewing Angle	Wide viewing angle (85°/85°/85°/85° typical), high contrast, and good color reproduction
Resolution	400×400 pixels
Active Area (A.A.)	Diameter=39.8mm
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
Note:You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time.	

2.2 Mechanical characteristics

Detent torque	Only suitable for C.C, equipment.: 300±100gf.cm
Number and Position of detents	Only suitable for C.C, equipment.: 24 detents (Step angle : 15°±3°)
Rotational life	The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~1000/h without electrical load, after which measurements shall be made
Switch circuit and Number of pulse	Single pole and single throw (push on)
Travel of switch	1.7±0.5mm
Operating force	6±3N (610±306gf)

2.3 Serial interface parameters

Mode	UART2: TTL/CMOS;				
Voltage Level	Test Condition	Min	Typ	Max	Unit
	Output 1, Iout = -4mA	3.0	3.3	-	V
	Output 0, Iout = 4mA	-	0	0.3	V
	Input 1	2.4	3.3	5.0	V
	Input 0	0	-	0.5	V
Baud Rate	3150~3225600bps, typical value of 115200bps				
Data Format	N81				
Interface Cable	6Pin_2.0mm				

2.4 Electrical specifications

Rated Power	<1W
Operating Voltage	4.5-5.5V, typical value of 5V
Operating Current	150mA @ 5V
Recommended power supply: 5V 1A DC	

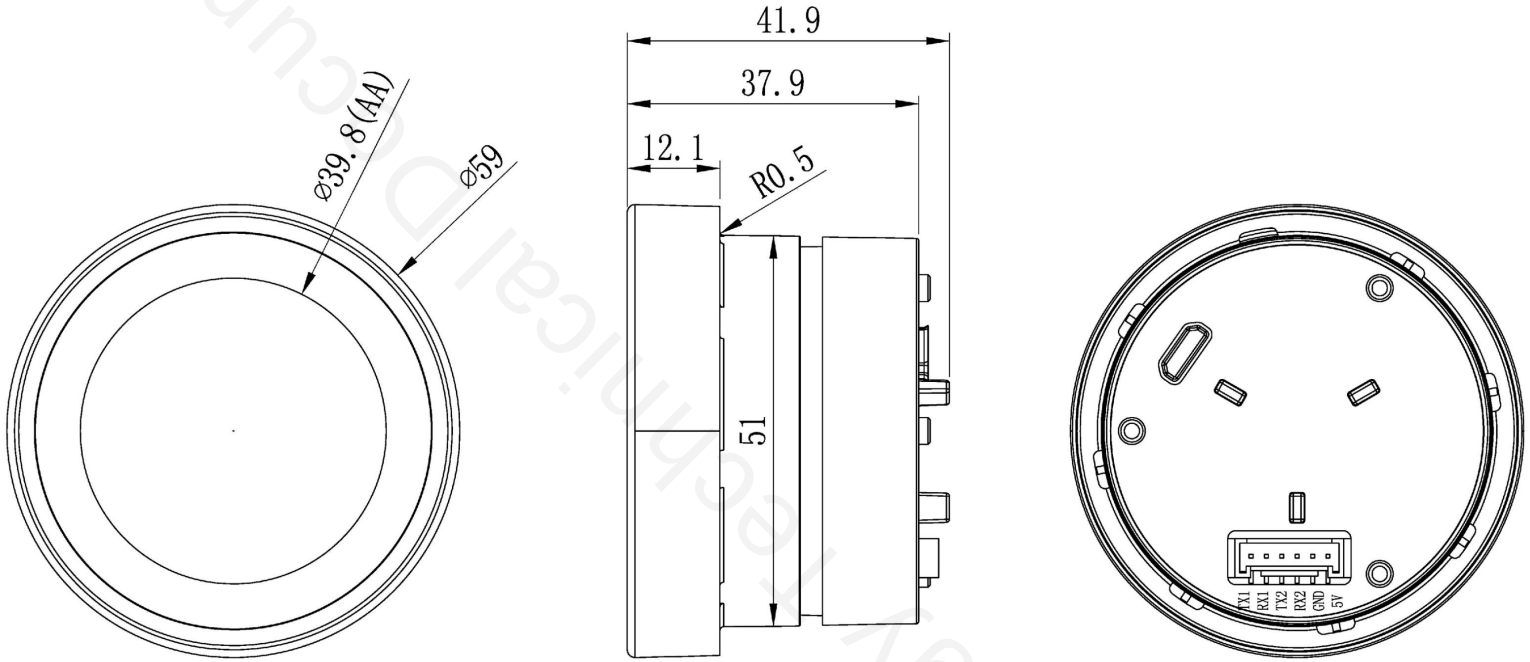
2.5 Operating environment

Operating Temperature	-20℃~70℃ (5V @ 60% RH)
Storage Temperature	-30℃~80℃
Conformal Coating	Yes
Operating Humidity	10%~90%RH, typical value of 60% RH

3. Packaging & dimensions

Form Factor	59.0mm diameter * 41.9mm height
Net Weight	60g
Packaging Standards	

Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	455mm(L)×355mm(W)×250mm (H)	4	25	100



Definition	Pin#	Type	Description
5V	1	P	Power Input
GND	2	P	GND
RX2	3	I	UART2 Input
TX2	4	O	UART2 Output
RX1	5	I	UART1 Input
TX1	6	O	UART1 Output

Location hole is used as position reference.

Unmarked Tolerance is +/-0.3mm

Active area is marked in Dash lines

Model	DMG40400C016-13WNZ154					DWIN Technology
Drawing	A 4	Drawn	DWIN	Date	250723	
Scale	1:1	Review		Date		
Unit	MM	Approval		Date		

4. T5L0-Q88 ASIC

T5L0 Q88 ASIC is a small package, low-power, cost-effective, GUI and application highly integrated single-chip dual-core ASIC designed by DWIN Technology for small-size LCD and mass produced in 2023.

(1) Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 400MHz, 1T(single instruction cycle)high speed operation.

(2) Separate GUI CPU core running DGUS II System:

- High-speed display memory, 2.4GB/S bandwidth. 18-bit color display resolution support up to 1024*768 (TA mode), 854*480 (DGUS mode).
- 2D hardware acceleration and the UI with animation and icons as its main feature is extremely cool and smooth.
- Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
- High quality ratio and sound restoration and playback.
- 128Kbytes variable storage space for exchanging data with OS CPU Core and memory.
- 2 10-bit 800KHz DC/DC controllers simplify LED backlight, analog power design and save cost and space.
- Support DGUS development and simulation on PC. Support backend remote upgrade.

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

- Standard 8051 core and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.
- 64-bit integer mathematical operation unit (MDU), including 64-bit MAC and 64-bit divider.
- 15 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channle 16-bit PWM of adjustable resolution.
- Support IAP online simulation and debugging with unlimited breakpoints.
- Upgrade code online through DGUS system.

(4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.

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

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

5. Revision records

Rev	Revise Date	Content	Editor
00	2024-05-29	First Edition	Xu Ying
01	2025-07-28	Encoder optimization, update drawings	Xu Ying

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

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

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