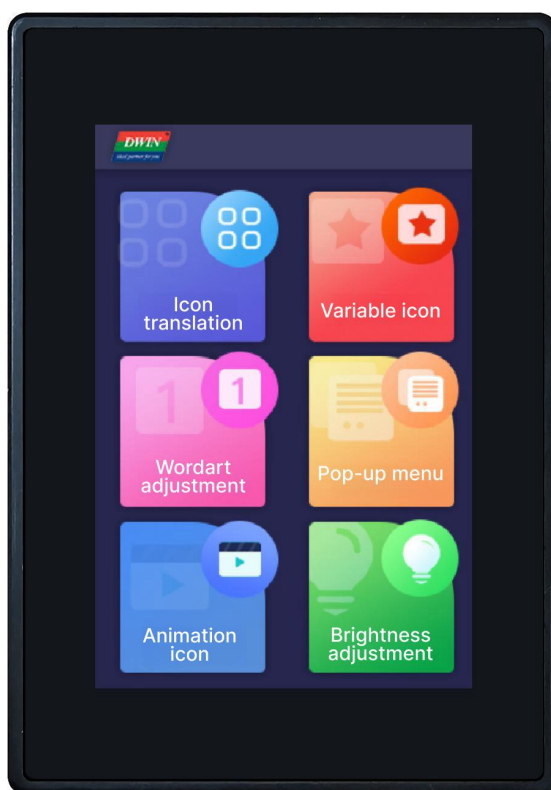


# DMG48320T035\_15WTR

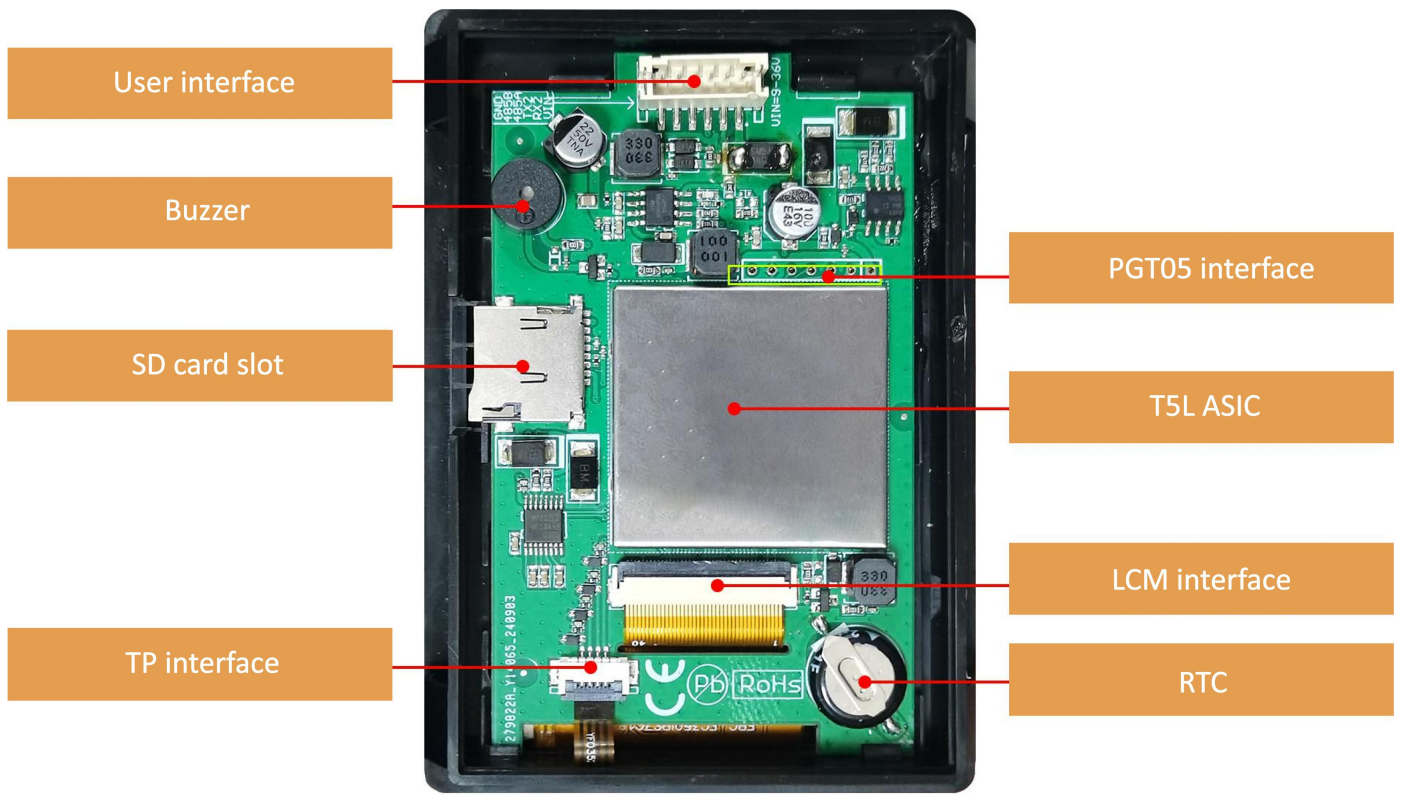
## Features:

- Powered by T5L0 ASIC, running DGUS II HMI platform, industrial-grade smart LCM.
- 3.5 inch, 320\*480 resolution, IPS-TFT LCD.
- Reliable resistive touch panel.
- With enclosure.



# 1. Hardware and interface

## 1.1 Hardware interface diagram



Hardware interface diagram

## 1.2 Hardware and interface description

No.	Item	Description
1	T5L0 ASIC	DWIN independently developed, mass production in 2020. 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	Flash	16MBytes (1*16MBytes NOR Flash) for storing UI files like fonts, images, music, with over 100,000 erase/write cycles.
4	Buzzer	3V passive buzzer.
5	RTC	Super-capacitor powered, accuracy: $\pm 20\text{ppm}$ @25°C, maintains operation for 7 days after power-off.
6	SD card slot	For DGUS project file downloads (UI, CFG files, kernel, etc.), 4 Mb/s rate.
7	PGT05 interface	For programming DGUS firmware.

## 2. Specification parameters

### 2.1 Display parameters

<b>LCD Type</b>	IPS, TFT LCD.
<b>Viewing Angle</b>	Wide viewing angle (85°/85°/85°/85° typical), high contrast, and good color reproduction.
<b>Resolution</b>	320×480 (support 0°/90°/180°/270°)
<b>Active Area (AA)</b>	49.00mm (W) ×73.40mm (H)
<b>Backlight</b>	LED
<b>Backlight Service Life</b>	>30000 hours
<b>Brightness</b>	200nit
<b>Brightness Control</b>	100-level brightness adjustment (Flickering may occur at 1%-30% of max brightness; not recommended for use in this range)
Note: Use dynamic screen saver to prevent afterimages from prolonged fixed page display.	

### 2.2 Touch parameters

<b>Type</b>	Resistive touch panel.
<b>Structure</b>	ITO film + ITO glass structure and hardness 3H.
<b>Light Transmittance</b>	78%
<b>Life</b>	Over 1,000,000 times touch.

## 2.3 Serial interface parameters

<b>Mode</b>	UART2: RS232 UART4: RS485 (Only available after OS configuration)				
<b>Voltage Level (RXD, TXD)</b>	Test Condition	Min	Typ	Max	Unit
	Output 1	-	-5.0	-3.0	V
	Output 0	3.0	5.0	-	V
	Input 1	-15.0	-5.0	-	V
	Input 0	-	5.0	15.0	V
<b>Baud Rate</b>	3150~3225600bps, typical value of 115200bps.				
<b>Voltage Level (V_AB)</b>	Test Condition	Min	Typ	Max	Unit
	Output 1	2.5	5.0	-	V
	Output 0	-	-5.0	-2.5	V
	Input 1	0	2.5	-	V
	Input 0	-	-2.5	-0.2	V
<b>Baud Rate</b>	3150~921600bps, typical value of 115200bps.				
<b>Data Format</b>	UART2: N81 UART4: N81/E81/O81/N82 ,4 modes (OS configuration)				
<b>Interface Cable</b>	6Pin_2.0mm				

## 2.4 Electrical specifications

<b>Rated Power</b>	<5W	
<b>Operating Voltage</b>	9-36V, typical value of 12V.	
<b>Operating Current</b>	78mA	VCC=12V, max backlight.
<b>Recommended power supply: 12V 1A DC.</b>		

## 2.5 Operating environment

<b>Operating Temperature</b>	-20°C to 70°C (12V @ 60% RH)	
<b>Storage Temperature</b>	-30°C to 80°C	
<b>Anti-UV</b>	None	
<b>Conformal Coating</b>	Yes	
<b>Operating Humidity</b>	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 on the test bench fixture (approximately 15cm in height), and perform contact and air discharge tests on the smart LCM. Observe if any freezing, black or white screen, flickering, or rebooting occurs during the test.

Test conclusion: The product's ESD performance meets GB/T 17626.2 Class B standards.

- 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
Screen					A	B		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV
J0	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

### 3.2 EFT test

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

Test process: Place the product flat on the test bench, power the smart LCM through the power supply coupled with an impulse generator. Observe if any reboot, abnormal display, or touch malfunction occurs during the test.

Test conclusion: The product's EFT performance meets GB/T 17626.4 Class B standards.

Test standard : 
  EN 61000-4-4:2012 
  IEC 61000-4-4:2012 
  GB/T 17626.4-2018  
 Other:

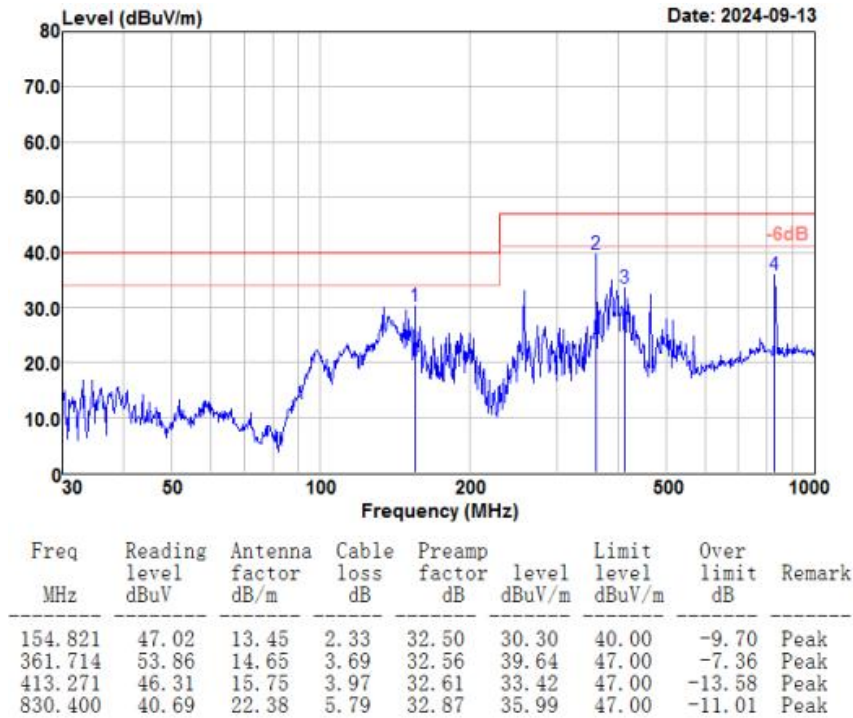
Test Points		Test Levels(kV)							
		-0.5	+0.5	-1.0	+1.0	-2.0	+2.0	-4.0	+4.0
DL Power ports	L					12	12		
	N					12	12		
	Earth								
	L+N					12	12		
	L + Earth								
	N + Earth								
	L+N+Earth								
Signal ports	_____								



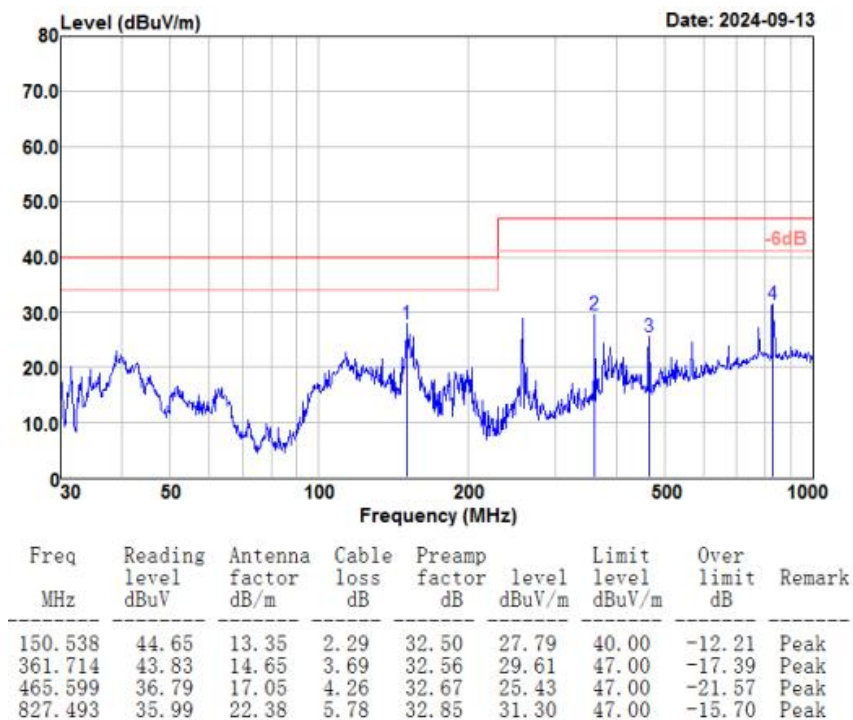
### 3.3 RE test

Test Item	Test Standard	Result
RE	Class B	Normal operation

#### HORIZONTAL



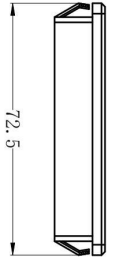
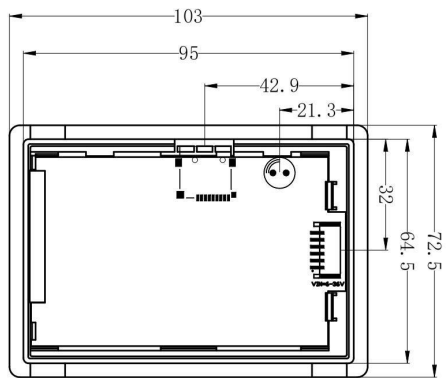
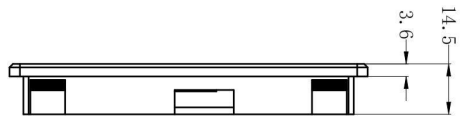
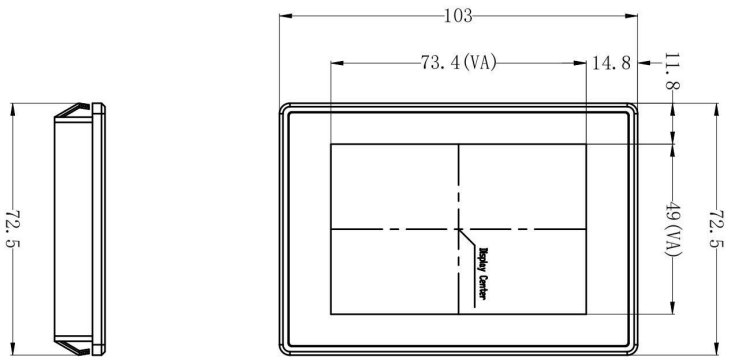
#### VERTICAL





#### 4. Packaging & dimensions

<b>Form Factor</b>	72.50mm (W)×103.00mm (H)×14.50mm (T)			
<b>Net Weight</b>	84g			
<b>Packaging Standards</b>				
<b>Model</b>	<b>Dimensions</b>	<b>Layer</b>	<b>Quantity/Layer</b>	<b>Quantity(Pcs)</b>
Carton1:	220mm(L)×160mm(W)×47mm (H)	1	2	2
Carton2:	250mm(L)×200mm(W)×80mm (H)	2	2	4
Carton3:	320mm(L)×270mm(W)×80mm (H)	2	4	8
Carton4:	525mm(L)×330mm(W)×80mm (H)	-	-	-
Carton5:	570mm(L)×340mm(W)×385mm (H)	2	60	120



Definition	Pin#	Type	Description
GND	6	P	GND
B	5	B-	485 B-
A	4	A+	485 A+
TX2	3	0	UART2 Output
RX2	2	I	UART2 Input
VIN	1	P	Power Input

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

Model	DMG48320T035_15WTR				
Drawing	A 4	Drawn	J. G	Date	20240828
Scale	1:1	Review		Date	
Unit	MM	Approval		Date	

DWIN Technology

## 5. T5L series IC features

- (1) 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) Separate GUI CPU Core running DGUS II System:
  - High-speed display memory, 2.4GB/S bandwidth.
  - 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.
  - Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
  - Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.
  - 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 variable storage space for exchanging data with OS CPU Core and memory.
  - Support DGUS development and simulation on PC. Support background 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 architecture 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.
  - 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.
  - Support IAP on-line simulation and debugging with unlimited number of 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°C to +85°C(IC operating temperature customizable from -55°C to 105°C).

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

## 6. Revision records

Rev	Revise Date	Content	Editor
00	2024-11-11	First Edition	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!

## **Important Disclaimer**

DWIN reserves the right to make any changes to product designs without prior notice.

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