

# DMG64480K035\_03WN

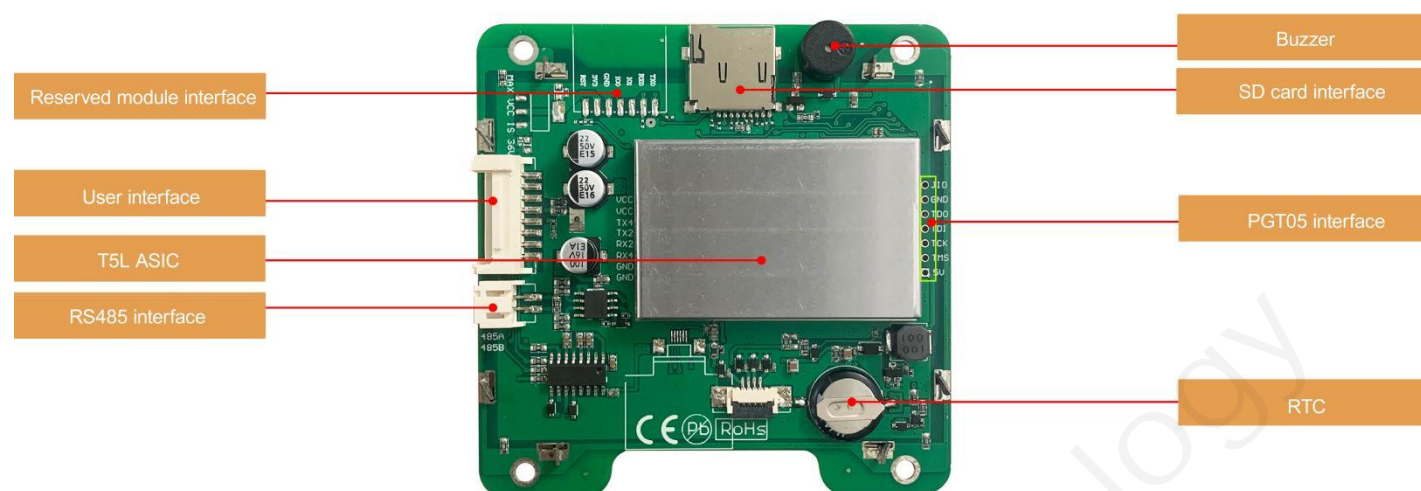
## Features:

- Based on T5L1, running DGUS II system, medical grade products.
- 3.5-inch, 640\*480 pixels resolution, 16.7M colors, IPS-TFT-LCD, wide viewing angle.
- Support RS232 and RS485 communication.
- With conformal coating.



## 1. Hardware and interface

### 1.1 Hardware interface



Hardware interface

## 1.2 Hardware and interface description

No.	Name	Description
1	T5L1 ASIC	Developed by DWIN. Mass production in 2019, 1MBytes Nor Flash on the chip, 512KBytes used to store the user database. Rewrite cycle: over 100,000 times
2	LCM interface	FPC40_0.5mm, MIPI interface
3	User interface	8Pin_2.0mm socket for power supply and serial communication. Download rate(typical value): 12KByte/s
4	RS485 interface	2Pin_2.0mm horizontal socket: For RS485 communication
5	Flash	16MBytes NOR Flash, for fonts, pictures and audio files. Rewrite cycle: over 100,000 times
6	Buzzer	3V passive buzzer. Power: <1W
7	RTC	Super-capacitor for power supply. Accuracy: $\pm 20\text{ppm}$ @25°C. It can work normally for 7 days after power failure
8	SD card interface	FAT32. Download files by SD interface can be displayed in statistics. Download rate: 4Mb/s
9	PGT05 interface	When product crashes by accident, you can use PGT05 to update DGUS kernel and make the product return to normal

## 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° (L/R/U/D)
<b>Resolution</b>	640×480 pixels (support 0°/90°/180°/270°)
<b>Color</b>	24-bit 8R8G8B
<b>Active Area (A.A.)</b>	70.08mm (W)×52.56mm (H)
<b>View Area (V.A.)</b>	-
<b>Backlight Mode</b>	LED
<b>Backlight Service Life</b>	>30000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
<b>Brightness</b>	200nit
<b>Brightness Control</b>	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.

## 2.2 Serial interface parameters

<b>Mode</b>	UART2: RS232 UART4: RS232 (Only available after OS configuration) UART5: RS485 (Only available after OS configuration)				
<b>Voltage Level UART2,4</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 UART2,4</b>	3150~3225600bps, typical value of 115200bps				
<b>Voltage Level UART5</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 UART5</b>	3150~921600bps, typical value of 115200bps				
<b>Data Format</b>	UART2: N81 UART4: N81/E81/O81/N82 ,4 modes (OS configuration) UART5: N81/E81/O81/N82 ,4 modes (OS configuration)				
<b>Interface Cable</b>	8Pin_2.0mm (RS232) 2Pin_2.0mm (RS485)				

## 2.3 Electrical specifications

<b>Rated Power</b>	<5W	
<b>Operating Voltage</b>	6~36V, typical value of 12V	
<b>Operating Current</b>	260mA	VCC=12V, max backlight
	120mA	VCC=12V, backlight off
<b>Recommended power supply: 12V 1A DC</b>		

## 2.4 Operating environment

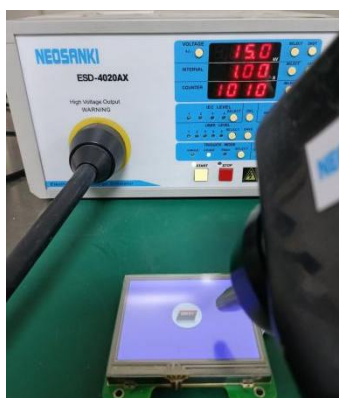
<b>Operating Temperature</b>	-20℃~70℃ (12V @ 60% RH)
<b>Storage Temperature</b>	-30℃~80℃
<b>Operating Humidity</b>	10%~90%RH, typical value of 60% RH
<b>Conformal coating</b>	Yes
<b>Aging Test</b>	72 hours high temperature charged aging at 50℃

### 3. Reliability test

#### 3.1 Electrostatic discharge test

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

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.3.1 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.



3.1 Electrostatic discharge test

Discharge Type	Discharge Value	Result
Contact discharge	±8KV	Normal operation
Air discharge	±15KV	Normal operation

#### 3.2 EFT test

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

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. 3.2 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.



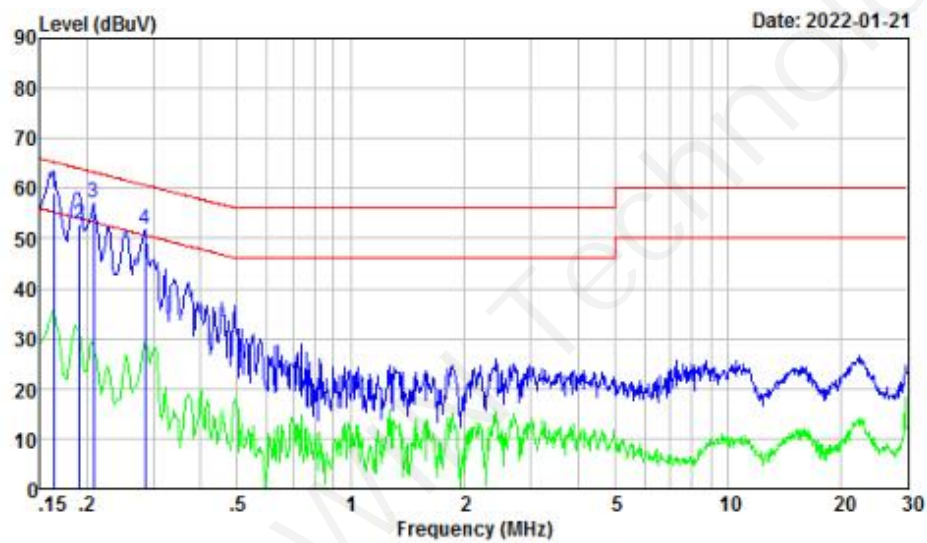
3.2 EFT test

Test Item	Test Standard	Result
Power supply	$\pm 2\text{KV}; 100\text{KHz}$	Normal operation

### 3.3 CE test

Test Item	Test Standard	Result
CE	ClassB-6dB	Normal operation

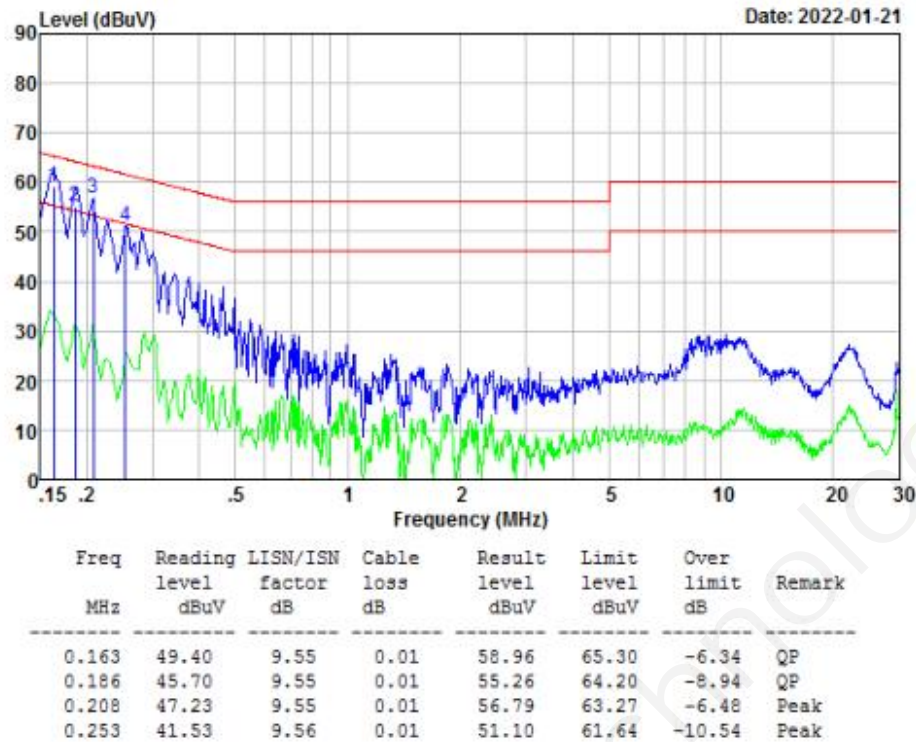
### LINE



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.163	49.70	9.55	0.01	59.26	65.30	-6.04	QP
0.190	43.40	9.56	0.01	52.97	64.02	-11.05	QP
0.208	47.44	9.56	0.01	57.01	63.27	-6.26	Peak
0.285	42.26	9.57	0.01	51.84	60.68	-8.84	Peak



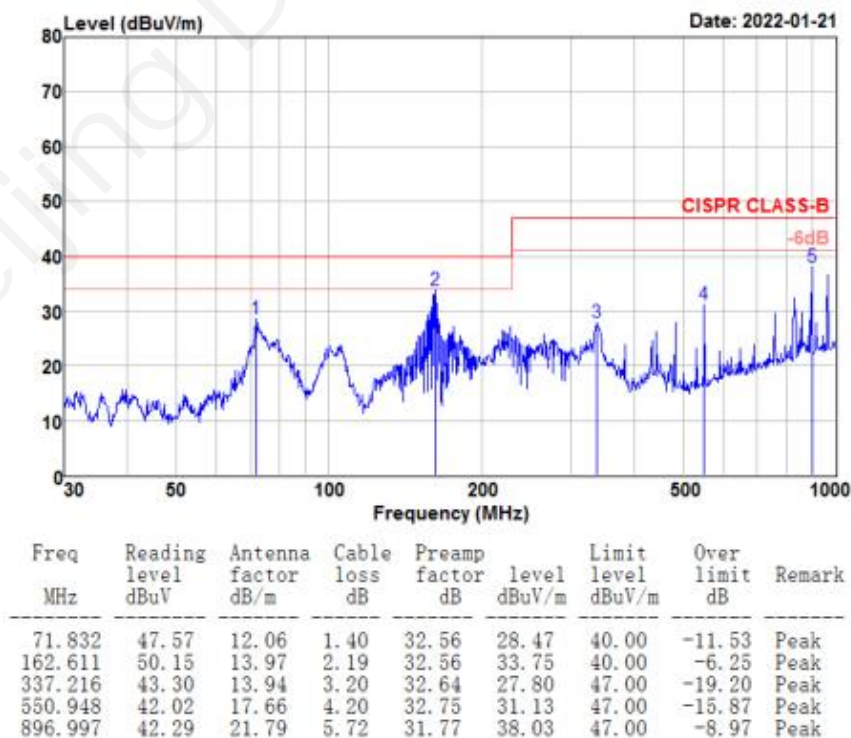
## NEUTRAL



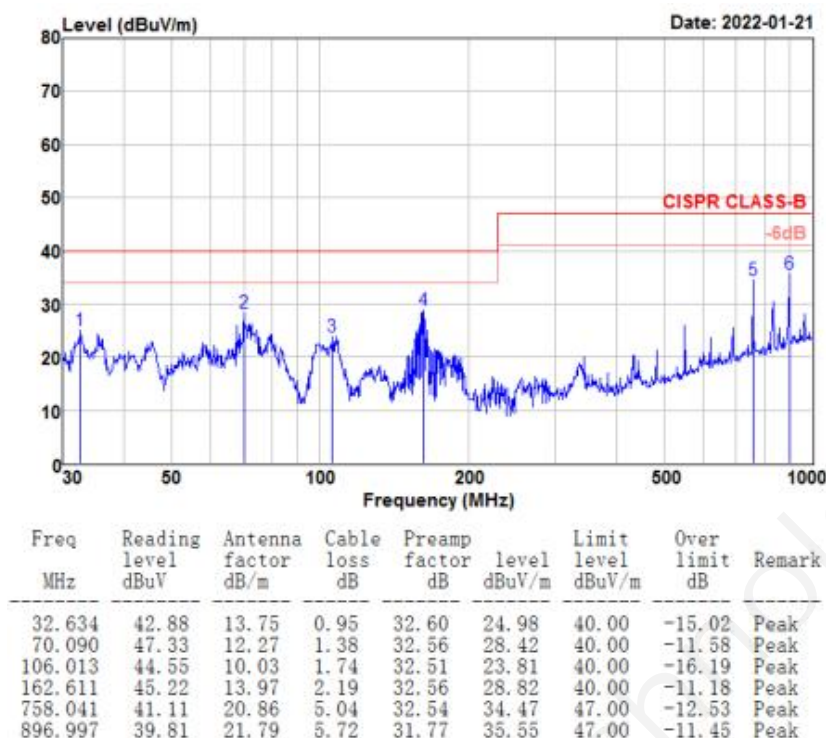
### 3.4 RE test

Test Item	Test Standard	Result
RE	ClassB-6dB	Normal operation

## HORIZONTAL



## VERTICAL



### 3.5 CS test

- Test standard : ☐ EN 61000-4-6:2014 ☐ IEC 61000-4-6:2013 ☒ GB/T 17626.6-2017  
☐ Other:  
 ■ Modulation: ☒ Amplitude 80%,1kHz sine wave ☐ Amplitude 80%,2Hz sine wave ☐ Other:  
 ■ Dwell time: ☒ 1s ☐ 3s ☐ other:  
 ■ Frequency Step Size : ☒ 1 % of preceding frequency value ☐ other:

Coupling Line	Frequency Range (MHz)	Voltage Level(e.m.f.) (V)	Result
Power Terminal	0.15-80	10	A

### 3.6 SURGE test

- Test standard : ☐ EN 61000-4-5:2014+A1:2017 ☐ IEC 61000-4-5:2014+A1:2017 ☒ GB/T 17626.5-2019  
☐ Other:

Table 1: \_\_\_\_\_DC\_\_\_\_\_ mains power input port

Level	Voltage	Polarity	Path	Result
1	0.5kV	±	/	/
2	1kV	±	Positive to negative	A
3	2kV	±	/	/
4	4kV	±	/	/

### 3.7 RS test

- Test standard : ☐ EN 61000-4-3:2006+A1:2008+A2:2010 ☐ IEC 61000-4-3:2006+A1:2007+A2:2010  
                                   ■ GB/T 17626.3-2016 ☐ other:  
 ■ Modulation: ■ Amplitude 80%,1kHz sine wave ☐ Amplitude 80%,2Hz sine wave ☐ Other:  
 ■ Dwell time: ■ 1s ☐ 3s ☐ other:  
 ■ Frequency Step Size : ■ 1 % of preceding frequency value ☐ other:

Frequency range (MHz)	Field strength (V/m)	Front side		Rear side		Left side		Right side	
		VER	HOR	VER	HOR	VER	HOR	VER	HOR
80-1000	10	A	A	A	A	A	A	A	A

#### 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.

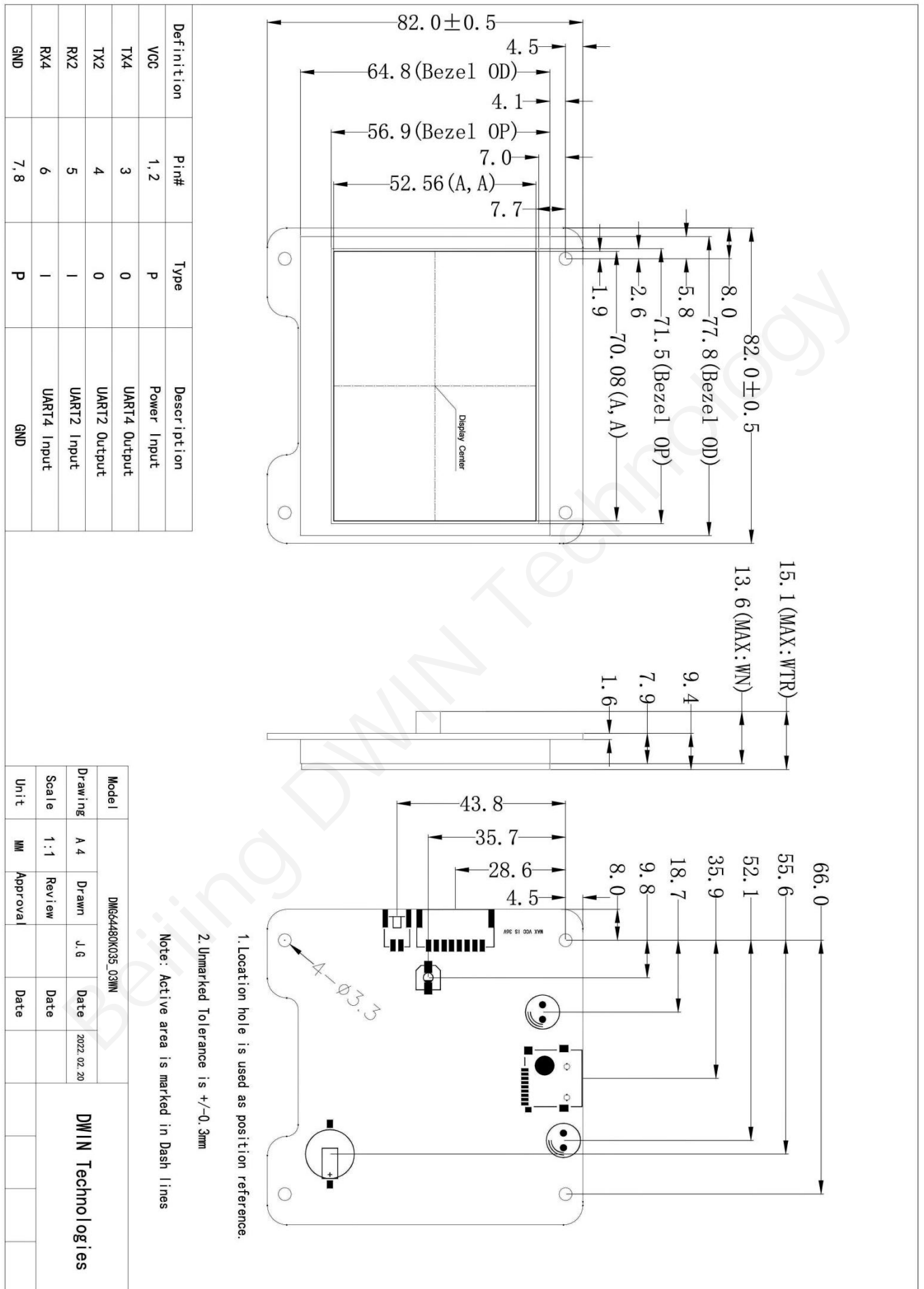
#### 4. Packaging & dimensions

<b>Form Factor</b>	82.0mm (W)×82.0mm (H)×13.6mm(T)
<b>Installation Dimensions</b>	Positioning hole: 77.8(+0.3mm)×64.8(+0.3mm)
<b>Net Weight</b>	80g

##### Packaging Standards

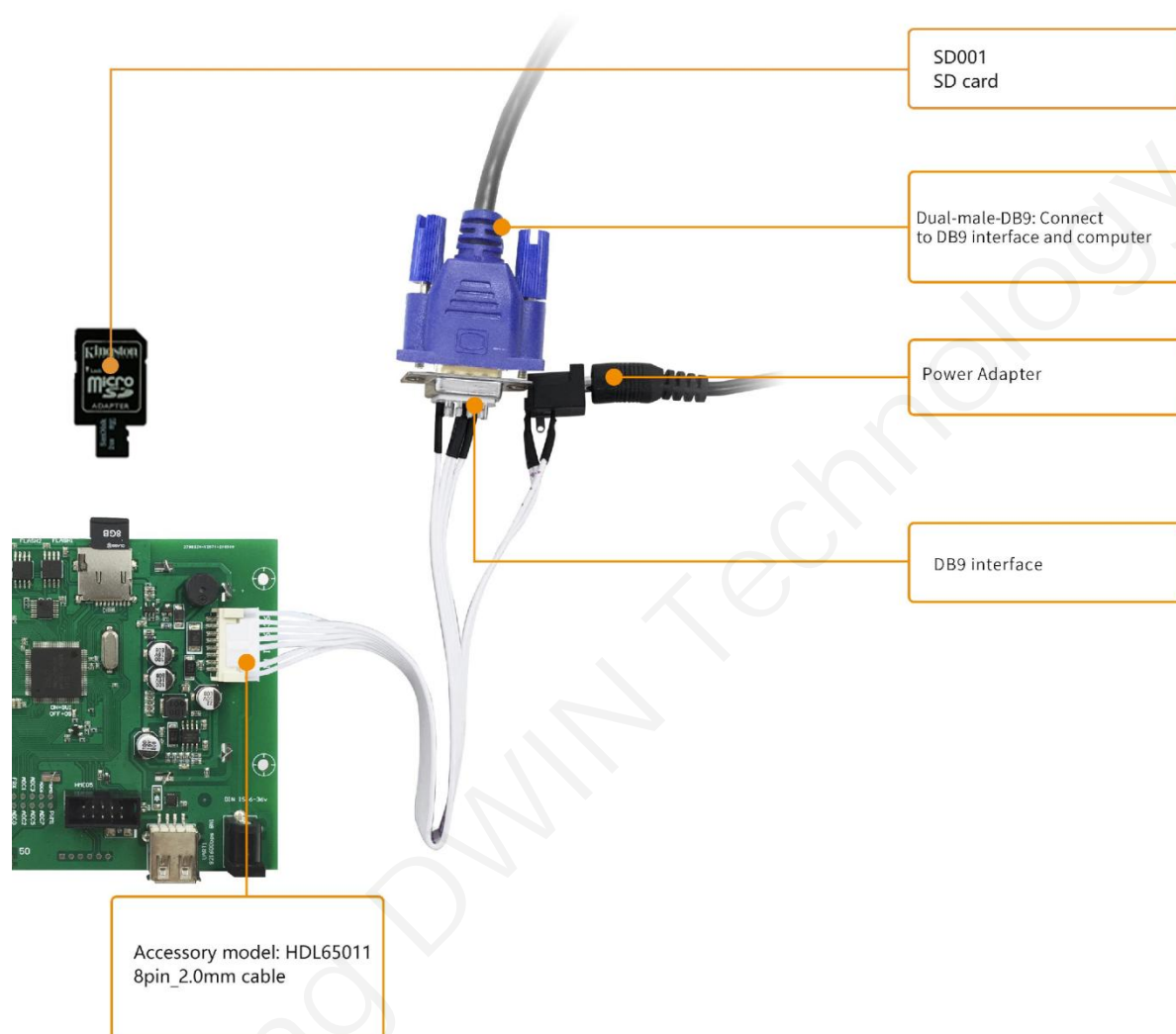
Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	220mm(L)×160mm(W)×47mm (H)	1	2	2
Carton2:	250mm(L)×200mm(W)×80mm (H)	2	2	4
Carton3:	320mm(L)×270mm(W)×80mm (H)	2	4	8
Carton4:	450mm(L)×350mm(W)×300mm(H)	2	30	60
Carton5:	600mm(L)×450mm(W)×300mm(H)	2	75	150

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



## 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

- (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**

## 7. Revision records

Rev	Revise Date	Content	Editor
00	2023-02-22	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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- DWIN Developer Forum: <https://forums.dwin-global.com/>

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