LI24240C013HA2098

1.28 inch, 240*240 pixels resolution, RGB interface, IPS-TFT-LCD

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

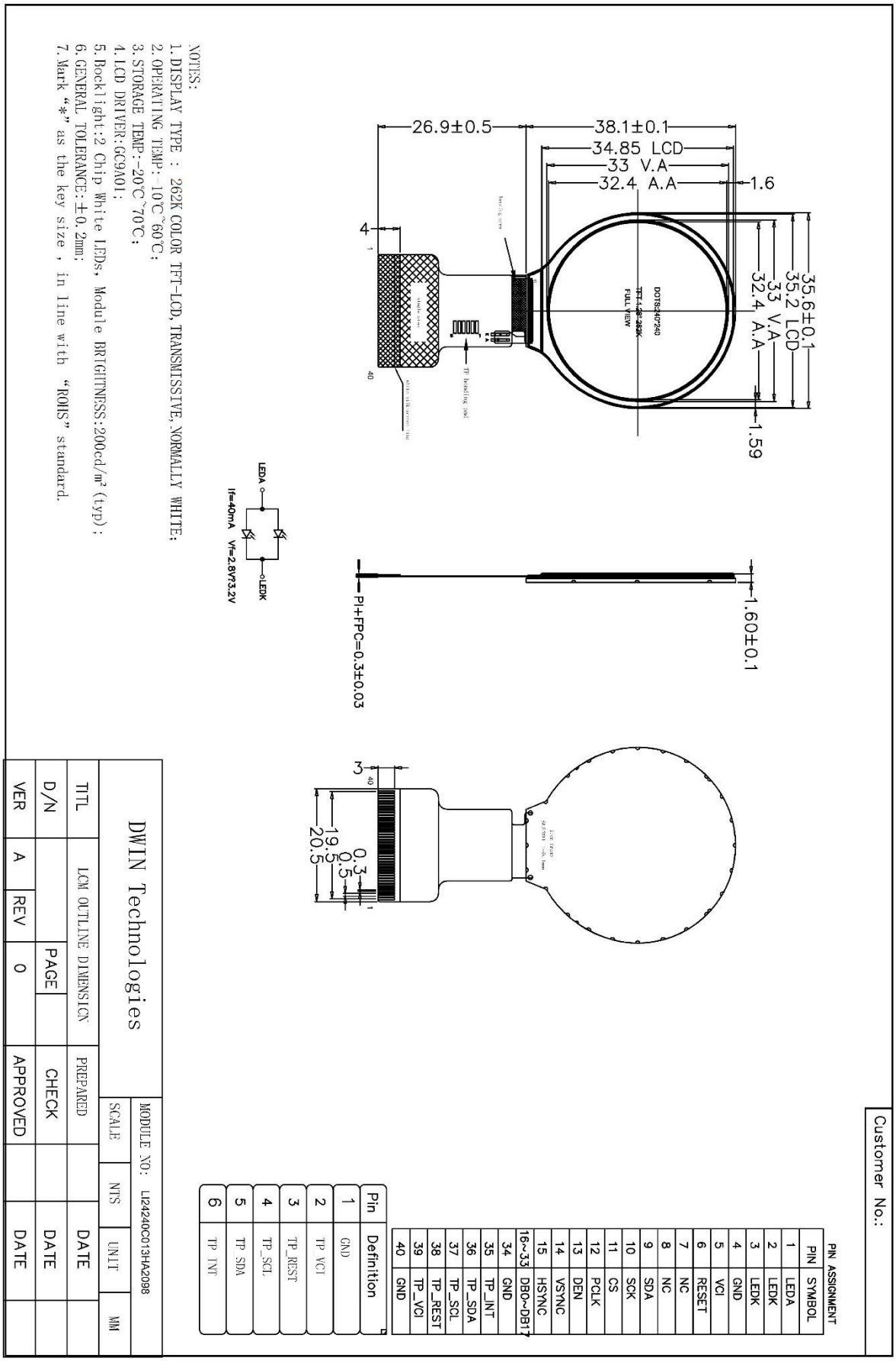
Table of Contents

1 General Feature

Feature		Description	Unit
Display Spec.	Size	1.28	inch
	Resolution	240(H)*240(V)	pixels
	Pixel Configuration	RGB stripe	-
	Pixel Pitch	0.135(H)*RGB*0.135(V)	mm
	Viewing Direction	ALL	-
Mechanical Characteristics	Outside Dimension	35.6(W)*38.1(H)*1.6(D)	mm
	Active Area	32.4(W)*32.4(H)	mm
	Luminance	200	cd/m²
	LED Numbers	2 LEDS	-
	Pin Order	From left to right 40PIN_0.5mm	-
Electrical Characteristics	Interface	RGB_18bit	-
	Color Depth	262K	colors
	Driver Condition	2.8(Type)	V
	Driver IC	GC9A01A	-
Temperature Range	Operating Temp.	-10~60	℃
	Storage Temp.	-20~70	℃

Note: Requirements on Environmental Protection: RoHS.
You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed paper display for a long time.

2 Mechanical Drawing



3 Input/Output Terminals

Pin NO.	Symbol	Function	Remark
1	LEDA	Back light anode	
2	LEDK	Back light cathode	
3	LEDK	Back light cathode	
3	GND	Ground	
5	VCI	Power supply	
6	RESET	Reset Signal pin	
7-8	NC	Not connect	
9	SDA	Serial data input/output bidirectional pin for SPI interface	
10	SCK	Serial clock input for SPI interface	
11	CS	A Chip Select signal	
12	PCLK	Clock signal	
13	DEN	Data enable	
14	VSYNC	Vertical sync input in RGB mode(short to GND if not used)	
15	HSYNC	Horizontal sync input in RGB mode(short to GND if not	
16~21	B0~B5	Blue Data	
22~27	G0~G5	Green Data	
28~33	R0~R5	Red Data	
34	GND	Ground	
35	TP_INT	Not connect	
36	TP_SDA	Not connect	
37	TP_SCL	Not connect	
38	TP_RESET	Not connect	
39	TP_VCI	Not connect	
40	GND	Ground	

4 Electrical Characteristics

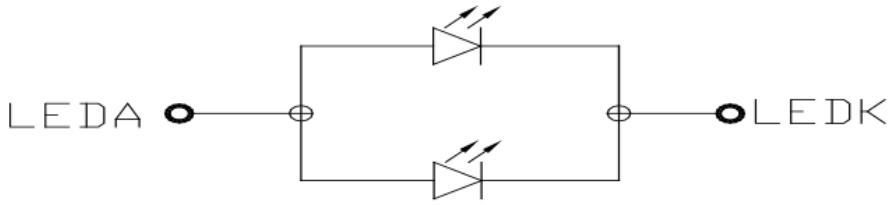
4.1 Driving TFT LCD Panel

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Digital Supply Voltage	VCC	2.5	2.8	3.3	V	
TFT Gate on Voltage	VGH	-	10.5	-	V	
TFT Gate off Voltage	VGL	-	-9.6	-	V	

4.2 LED Backlight Specification

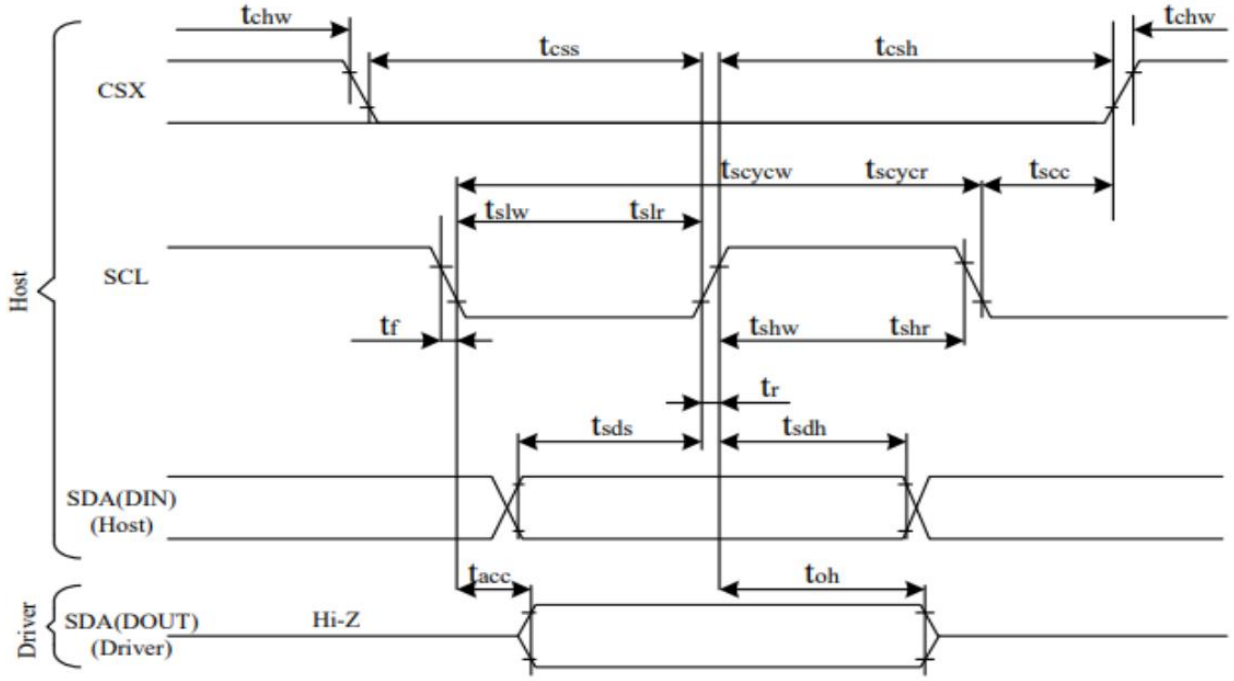
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Voltage	V_f	2.8	3.0	3.2	V	
Forward Current	Ipn	-	40	-	mA	
Reverse Current	Ir	-	-	0.04	uA	
Luminance(with LCD)	Lv	-	200	-	cd/m²	
Uniformity	YU	75	-	-	%	
LED Life-Time	Hr	20000	-	-	Hour	

Note: 2 LEDs



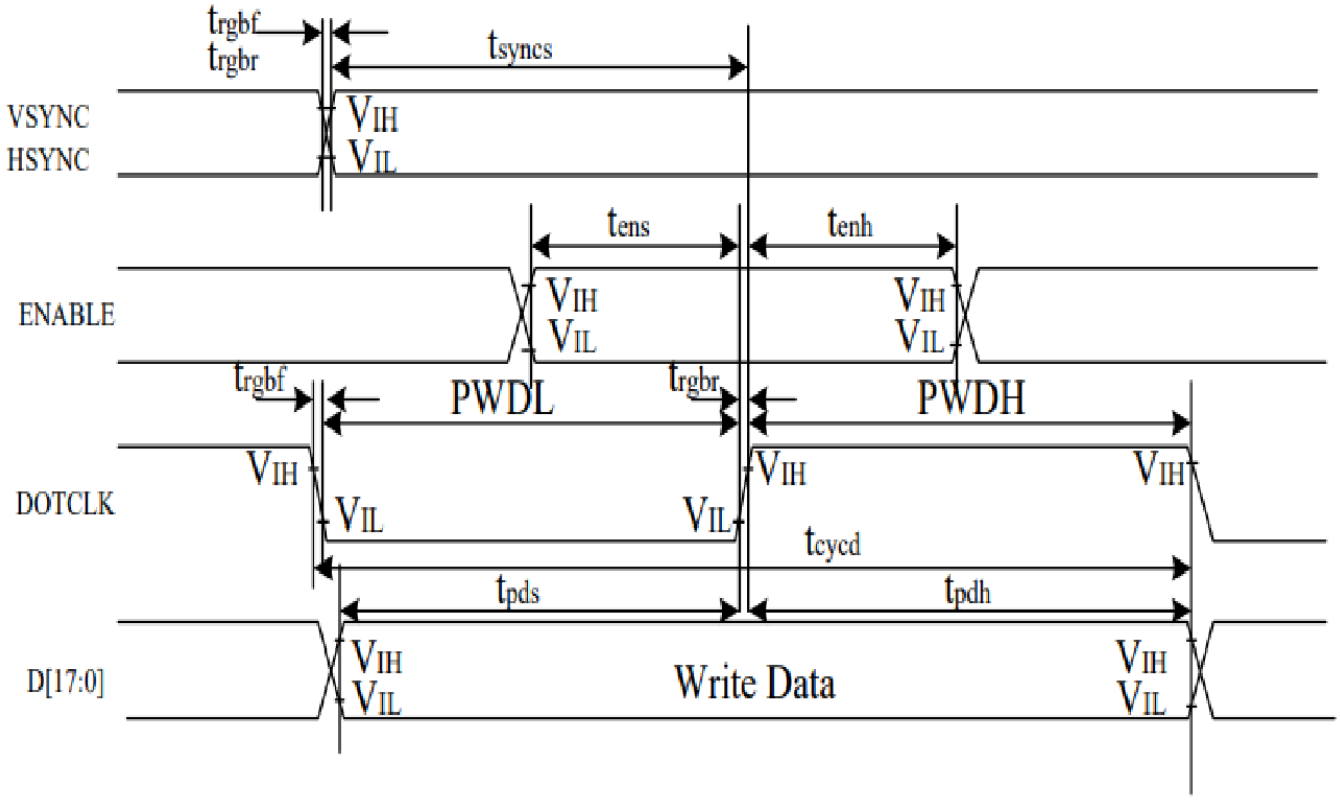
5 Timing Characteristics

5.1 3-line Serial Interface Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
SCL	tscycw	Serial Clock Cycle (Write)	10	-	ns	
	tshw	SCL "H" Pulse Width (Write)	5	-	ns	
	tslw	SCL "L" Pulse Width (Write)	5	-	ns	
	tscycr	Serial Clock Cycle (Read)	150	-	ns	
	tshr	SCL "H" Pulse Width (Read)	60	-	ns	
	tslr	SCL "L" Pulse Width (Read)	60	-	ns	
SDA/SDI (Input)	tsds	Data setup time (Write)	5	-	ns	
	tsdh	Data hold time (Write)	5	-	ns	
SDA/SD0(Outp)	tacc	Access time (Read)	10	-	ns	
CSX	tscc	SCL-CSX	10	-	ns	
	tchw	CSX "H" Pulse Width	10	-	ns	
	tcss	CSX-SCL Time	20	-	ns	
	tcsh		40	-	ns	

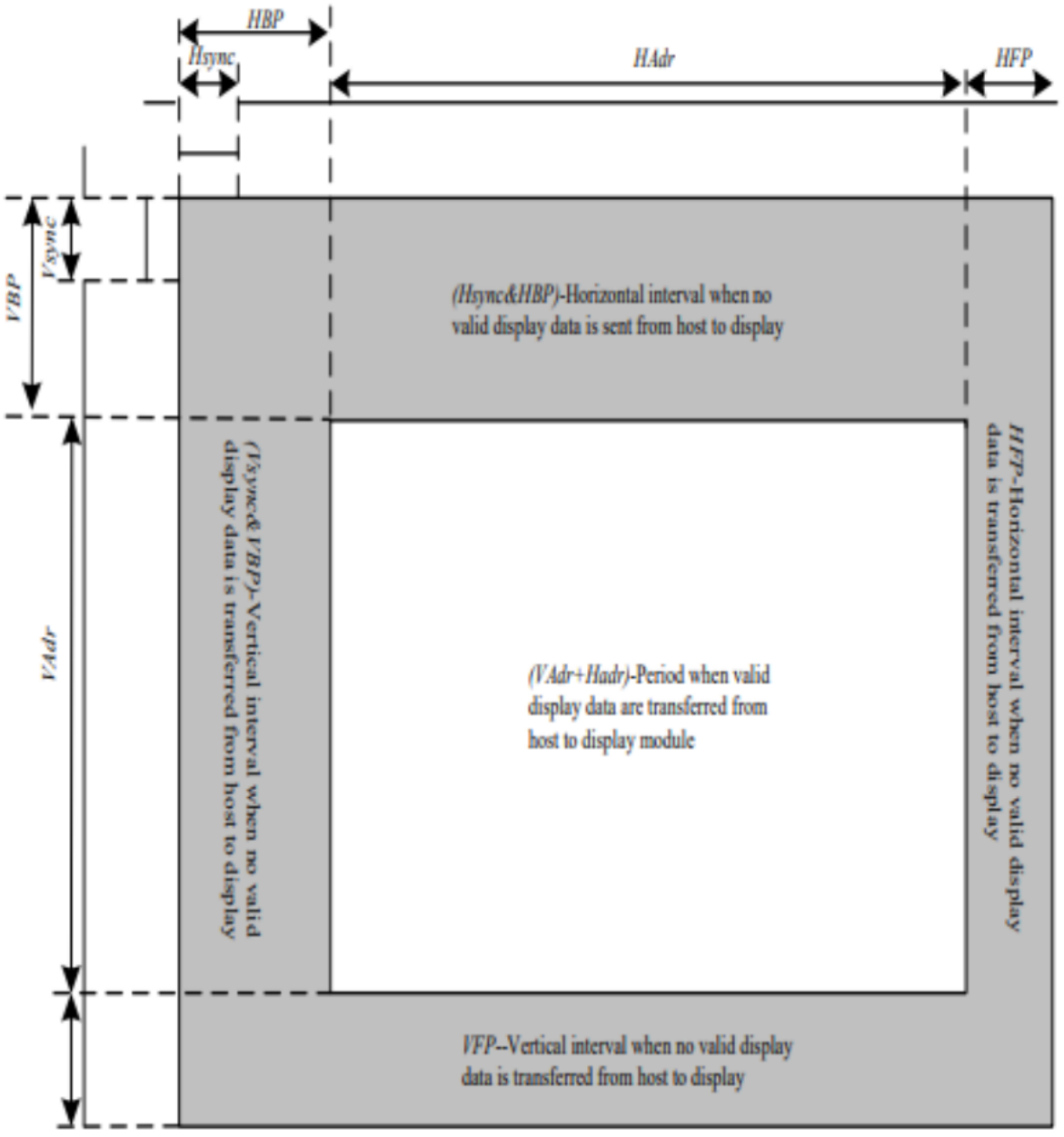
5.2 RGB Interface Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC/HSYNC	tsyncs	VSYNC/HSYNC setup time	15	-	ns	18/16-bit bus RGB interface mode
	tsynch	VSYNC/HSYNC hold time	15	-	ns	
DE	tens	DE setup time	15	-	ns	
	tenh	DE hold time	15	-	ns	
D[17:0]	tpos	Data setup time	15	-	ns	
	tpdh	Date hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level period	15	-	ns	
	PWDL	DOTCLK low-level period	15	-	ns	
	tcycd	DOTCLK cycle time	100	-	ns	
	trgbr,trgbf	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	

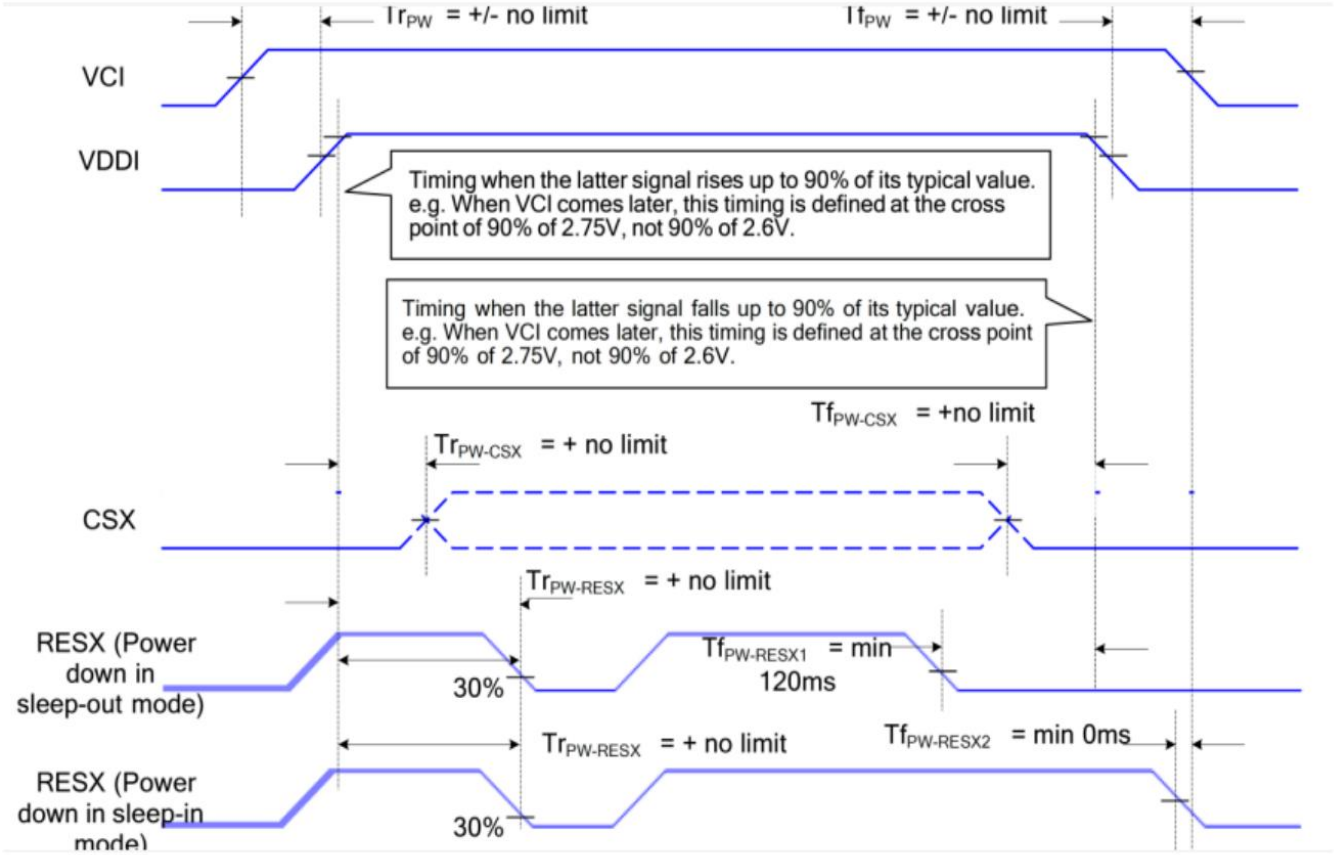
5.3 RGB Interface Definition

Parameters	Symbols	Condition	Min.	Typ.	Max.	Units
Horizontal Synchronization	Hsync		2	10	16	DOTCLK
Horizontal Back Porch	HBP		2	20	24	DOTCLK
Horizontal Address	HAdr		-	320	-	DOTCLK
Horizontal Front Porch	HFP		2	10	16	DOTCLK
Vertical Synchronization	Vsync		1	2	4	Line
Vertical Back Porch	VBP		1	2	-	Line
Vertical Address	VAdr		-	240	-	Line
Vertical Front Porch	VFP		3	4	-	Line



5.4 Power Function Description

Power Sequence



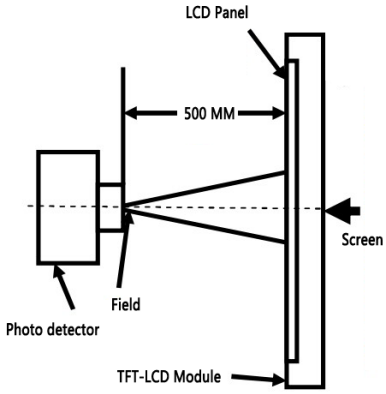
6 Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	Top	CR≧10	-	85	-	Deg.	Note 1
	Bottom		-	85	-		
	Left		-	85	-		
	Right		-	85	-		
Contrast Ratio	CR	θ=0°	900	1100	-		Note 2
Response Time	T_r+T_f	θ=0°	-	30	35	ms	
Color Chromaticity (CIE1931)	Wx	θ=0°	-	-	-		
	Wy		-	-	-		
	Rx		-	-	-		
	Ry		-	-	-		
	Gx		-	-	-		
	Gy		-	-	-		
	Bx		-	-	-		
	By		-	-	-		
Transmittance	Tr	θ=0°	4.4	4.9	-	%	

Test conditions:
IF= 40 mA, and the ambient temperature is 25℃.

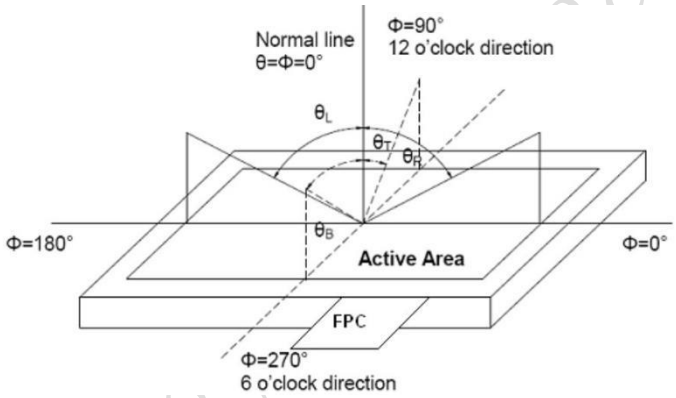
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of LCD.



Note 2: Definition of viewing angle range and measurement system.

The viewing angle is measured at the center point of the LCD by BM-7A.

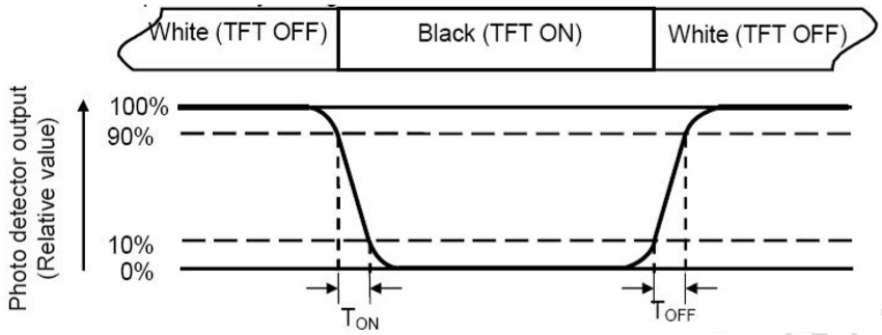


Note 3: Definition of color temperature.

When the radiation of the light source is exactly the same in the visible region and the absolute blackbody, the temperature of the blackbody is called the color temperature of the light source. Color temperature is an index to measure the degree of light source color (cold color, warm color). Warm color < 3300K, intermediate color 3300 ~ 5000K, cold color > 5000K.

Note 4: Definition of response time.

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Time ON (TON) is the time between photo detector output intensity changed from 90% to 10%. And time off (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931).

Color coordinates measured at center point of LCD.

Note 6: Definition of luminance.

Measure the luminance of white state at center point.

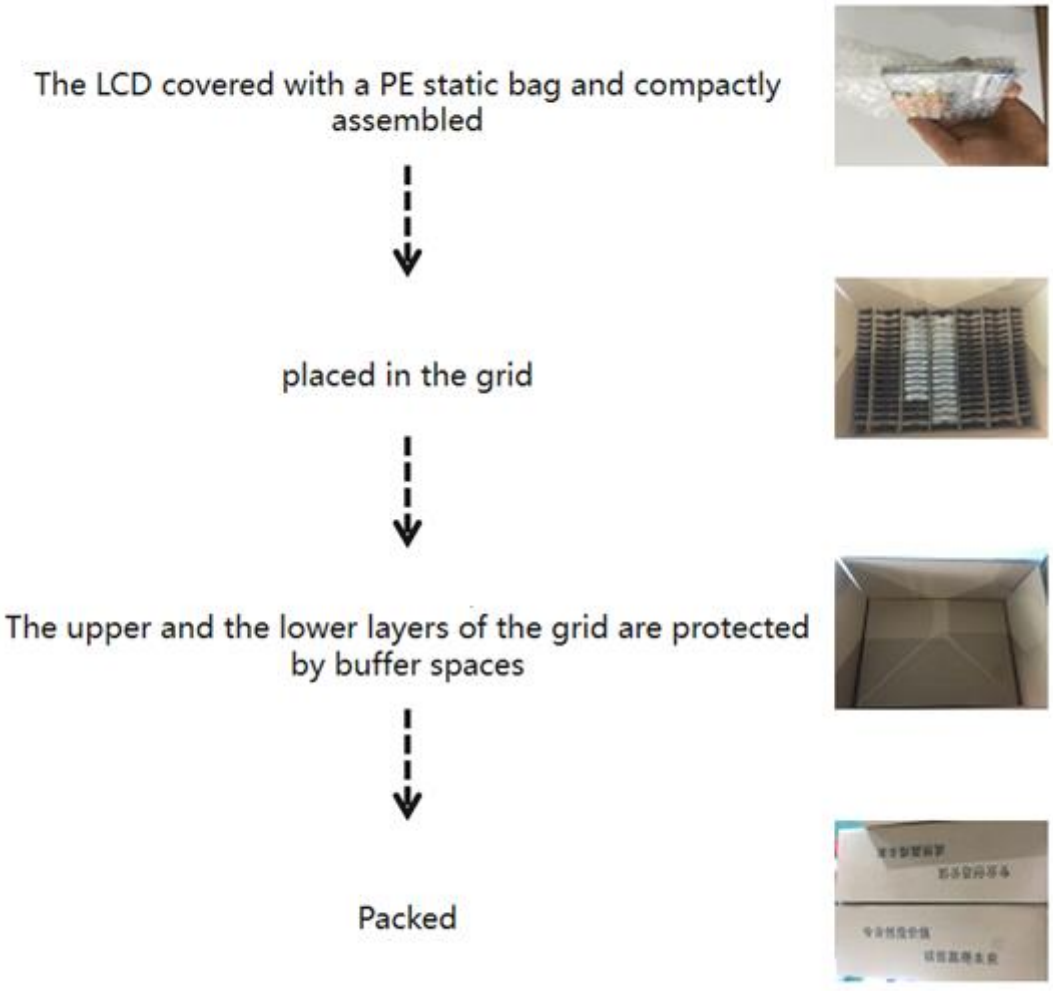
7 Environmental Reliability Test

NO	Test Item	Condition	Remarks
1	High Temperature Operation	Ta=+60℃, 48hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta=-10℃, 48hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=+70℃, 96hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-20℃, 96hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+60℃, 90% RH,48hours	IEC60068-2-78 :2001 GB/T2423.3-2006
6	Thermal Shock (non-operation)	-20℃ /30min← →+60℃/30min,10cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984, GB 2423.22-2002

8 Packing Capacity & Dimension

Dimension			
Dimension(mm)	35.6(W)*38.1(H)*1.6(D)		
Net Weight	-		
Packing Capacity			
Size	**LCD Size and Resolution**	**Layer**	**Quantity(Pcs)**
220mm(L)x160mm(W)x47mm(H)	1.28 inch 240*240	1	1
600mm(L)x450mm(W)x300mm(H)	1.28 inch 240*240	2	240

Packing instruction：
The LCD is placed in the grid, covered with a PE static bag and compactly assembled, the upper and the lower layers of the grid are protected by buffer spaces.



9 Appearance Inspection

9.1 General rules for inspection

9.1.1 Anti-static wearables (anti-static wristbands, gloves) must be worn during the inspection.

9.1.2 Do not use bare hands to touch the position of the device, golden fingers, and the surface of the screen to prevent the sweat from human hands from causing oxidation and affecting the appearance.

9.1.3 It is forbidden to stack products out of specification and handle them with care to avoid damage to components.

9.1.4 The repaired products need to be inspected to prevent rosin and tin slag from exceeding the specifications.

9.1.5 When technical documents and process documents have specific requirements for products, the technical documents and process documents shall be the main requirements.

9.2 Inspection conditions

9.2.1 The conditions of display function check

Angle: ±5°;

Inspection method: visual inspection. The inspection object is 30-40cm away from the light source, and the eye is 30-40cm away from the inspection object;

Illumination: 300-500Lux;

Inspection time: 5-10S.

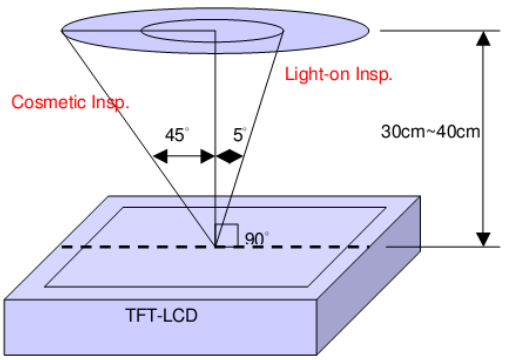
9.2.2 Visual inspection conditions

Angle: ±45°;

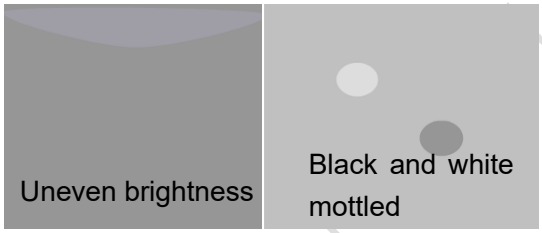
Inspection method: visual inspection. The inspection object is 30-40cm away from the light source, and the eye is 30-40cm away from the inspection object;

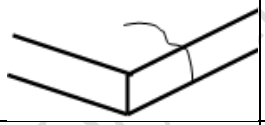
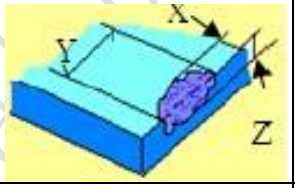
Illumination: 800-1500Lux;

Inspection time: 5-10S.



9.3 Inspection standards

Type	Test Items	Judgement Standard	Defect Category
Display state	Dead pixels	No dead pixels	
	mura	From different angles, the brightness is required to be uniform. Under the 64-level grayscale or pure black interface, there should be no uneven display brightness within the viewing angle range of 45° through 6% ND FILTER. Y series (TV film) LCD screen does not have specific requirements, and the picture inspection does not affect the display as qualified.  Uneven brightness　Black and white mottled	Slight defect
	Light leakage	Under the 64-level grayscale or pure black interface, there should be no obvious light leakage within the viewing angle range of 45° by visual inspection or through 6% ND FILTER. Y series (TV LCD screen) series can be without obvious visual defects.	Slight defect
	Linear foreign bodies	1. W≤0.05, L≤2mm, negligible; 2. 0.05mm＜W≤0.1mm, L≤2mm, N≤3; 3. W＞0.1mm, L＞2mm, not allowed.	Slight defect
Screen surface	Within the effective area	Spotted: 1. D≤0.2mm and it is not a piece, it is not counted; 2. 0.2mm＜D≤0.5mm, N≤3; 3. D>0.5mm, L>0.5mm, W>0.5mm are not allowed; (The spotted foreign objects shall not exceed the point-line gauge D=0.5, and the black dot coverage shall be checked, and the spotted foreign objects shall be judged within the range of D=0.5)	Slight defect

	Foreign objects Scratch Air bubbles	Linear: 1. W≤0.05, L≤2mm, ignored; 2. 0.05＜W≤0.1mm, L≤2mm, N≤3; 3. W>0.1mm, L>2mm, not allowed.	
	Outside the effective area Foreign objects Scratches Air bubbles	。 Foreign objects are not checked, and bubbles are not allowed to D>1mm; Non-inductive scratches of no more than 0.1×8mm are allowed.	Slight defect
	Crack	Not allowed. 	Slight defect
	Notch	1. Does not affect the appearance from the front; 2. Does not affect the relevant alignment; 3. X≤1mm, Y≤1mm, N≤2. 	Slight defect
	Glass side Foreign objects Dirty	。 1. The foreign body on the side is not controlled; 2. The paint pen marks on the side are not controlled; 3. Side oily note printing is not allowed.	Slight defect
FPC	Cracks Goldfinger crease	Not allowed.	Heavy deficit
	Crease	Slight creases are not controlled; The crease is whitish and has lines, which is not allowed.	Heavy deficit
	Top wound, stab wound	No damage to the line, D≤0.2mm; Damage to the line is not allowed.	Heavy deficit
	Scratch	Slight scratches on the surface are not controlled; Damage to the line is not allowed.	Heavy deficit
	Goldfinger scratch	W≤0.05mm, no control; W＞0.05mm, not allowed; Test probe tip marks are not controlled.	Heavy deficit
	Component	Under-soldering, over-soldering and false soldering are not allowed.	Heavy deficit

10 Precautions for Use of LCD Modules

10.1 Handling Precautions

10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, Can only use LCD dedicated cleaner, the following organic solvent can not be used:

- Isopropyl alcohol
- Ethyl alcohol
- Ketone
- Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

10.1.7 If the logic circuit power is off, do not apply the input signals.

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an

10.1.9 optimum work environment.

10.1.9.1 Be sure to ground the body when handling the LCD Modules.

10.1.9.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.9.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.9.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage precautions

10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature: 0℃ ~ 40℃ Relatively humidity: ≤80%.

10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

10.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

11 LCD Introduction

11.1 Process capacity

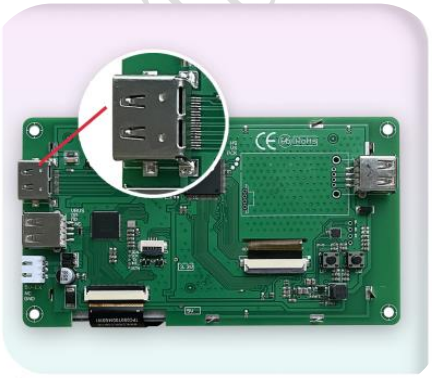
DWIN adopts original class A glass and the entire production is in the park from cleaning, cutting, bonding, and laminating of large glass to backlight assembly, quality inspection, and aging.

There are 12,000 square meters of clean workshop, with a monthly production capacity of about 2.5 million pieces. Each piece of LCD produced in the factory is for 30 days of aging.

11.2 ODM service

Based on LCD products of 1.5~21.5 inches, DWIN provides the following customization services.

1、LCD HDMI interface customization.



HDMI interface

2、Special screen customization such as high brightness, ultra-wide temperature and strong electromagnetic protection.

High luminance
(up to 1200nit)

Ultra-wide temperature
(-40~85℃)

Strong electromagnetic protection

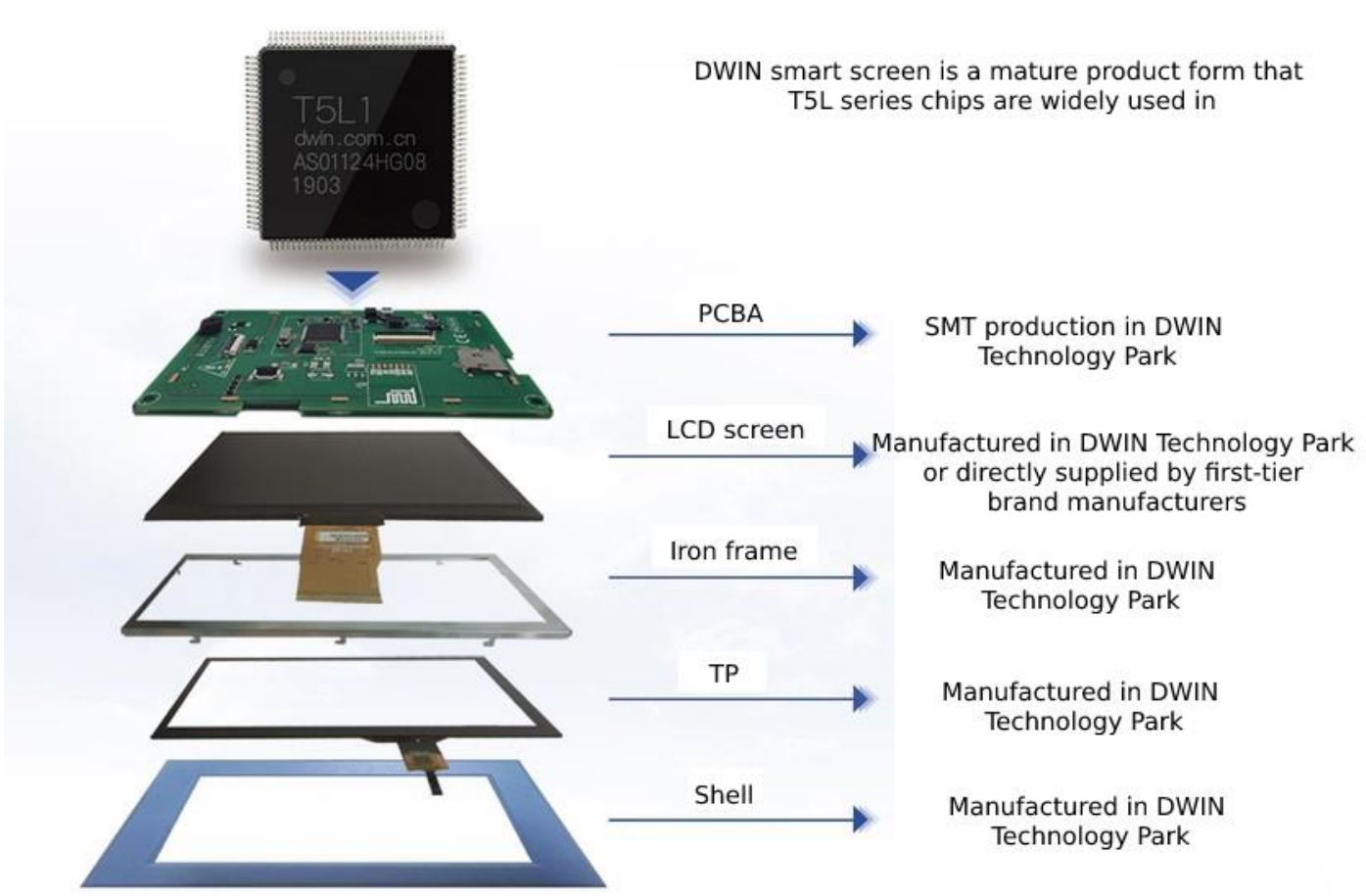
3、Lamination customization service of LCD + TP.

LCM+RTP

LCM+CTP

4、Customization service of DWIN self-developed T5L ASIC+ LCD + TP.

5、Smart screen finished product customization.



Please contact our sales staff for other customization needs.

Record of Revision

Rev	Date	Description	Editor
00	2022-07-11	First Release	Ouyang Kaixing
01	2023-02-02	Revise Model No. and Add Product Picture	Chen Xian
02	2023-02-21	Update Packing Capacity	Chen Xian

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:

Customer service tel: +86 400 018 9008

Customer service email: dwinhmi@dwin.com.cn

DWIN developer forum: https://forums.dwin-global.com/index.php/forums/

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