SPECIFICATIONS

规 格 说 明 书

CUSTOMER 客户	:	**SCHUKAT**
MASS PRODUCTION CODE 产品编号	:	**SMMH043480272G-C28**
SAMPLE VERSION 样品版本	:	**02**
SPECIFICATIONS EDITION 规格书编号	:	**003**
DRAWING NO. (Ver.) 图纸编号(版本)	:	**SMMH043480272G-C28-WX-E**

Customer Approved

客户审批

Date 日期:

Approved 审批者	Checked 校对者	Designer 设计者
闫伟	李昀/郑姗俊	王苏阳/费翔

JS SMARTWIN 2026/10/27 R&D Department

☐ Preliminary specification for design input

设计输入的初步规格

☑ Specification for sample approval

样品审批规格

History of Version 版本修改记录

Date (mm / dd / yyyy) 日期 (月 / 日 / 年)	Ver. 版本	Edi. 编号	Description 修订内容说明	Page 页码	Design by 修订者
10/21/2024	01	001	New Spec.	-	洪康凯
01/21/2025	01	002	The module adds edging tape.	4	洪康凯
10/26/2026	02	003	Update driver IC (ST7282P-G6-LS),absolute maximum ratings and DC characteristics	4，5 13	王苏阳
			Update optical characteristics	6，10	
			Update CTP characteristics	11	
			Add block diagram	13	
			Update inspection specification	23-30	
			Update reliability test	31-32	
			Update precautions	33-35	
			Update drawing (Rev E)	36	

Contents 目录

1. SPECIFICATIONS 规格参数
- 1.1 Features 特征
- 1.2 Mechanical Specifications 机械规格参数
- 1.3 Absolute Maximum Ratings 极限参数
- 1.4 DC Electrical Characteristics 直流特性
- 1.5 Optical Characteristics 光学特性
- 1.6 Backlight Characteristics 背光特性

2. MODULE STRUCTURE 模块结构
- 2.1 Counter Drawing 外形图纸
- 2.2 Interface Pin Description 接口描述
- 2.3 Timing Characteristics 时序

3. INSPECTION SPECIFICATION 检验标准

——General Inspection Standard for Industrial TFT

——工控 TFT 产品通用出货检验标准

4. RELIABILITY TEST 可靠性测试

5. PRECAUTION RELATING PRODUCT HANDLING 使用注意事项

Appendix：附录：
1. LCM Drawing LCM 图纸

1. SPECIFICATIONS 规格参数

1.1 Features 特征

Item 项目	Standard Value 标准值
Display Type 显示分辨率	480 (RGB)* 272
LCD Type 液晶显示类型	Normally Black, Transmissive type
Screen size(inch) 屏幕尺寸（吋）	4.3 inch
Viewing Direction 视角方向	FREE
Interface 接口	RGB -24BIT
Other(controller/driver IC) 其他（控制器/驱动集成电路）	ST7282P-G6-LS

1.2 Mechanical Specifications 机械规格参数

Module 模块

Item 项目	Standard Value 标准值	Unit 单位
Outline Dimension（W×H×T） 外形尺寸（宽×高×厚）	121.82(W) ×80.64(L) ×4.92(H) mm	mm
Active Area（W×H） 有效区域（宽×高）	95.04(W)x53.86(L)	mm

1.3 Absolute Maximum Ratings 极限参数

Module 模块

Parameter 参数	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位
Main power supply and I/O power supply 工作电压	VDD	-0.5	-	6.6	V
Operating temperature 工作温度	TOP	-30	-	+80	℃
Storage temperature 储存温度	TST	-30	-	+80	℃

1.4 DC Electrical Characteristics 直流特性

Module 模块

GND = 0V, Ta = 25°C

Item 项目	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位
Main power supply and I/O power supply 逻辑电压	VDD	-	3.0	3.3	3.6	V
Input H/L Level Voltage 输入高/低电平	VIH	-	0.7VDD	-	VDD	V
	VIL	-	GND	-	0.3 VDD	V
Output H/L Level Voltage 输出高/低电平	VOH	-	VDD-0.4	-	VDD	V
	VOL	-	GND	-	GND+0.4	V
Supply Current 电源电流	IDD	VDD = 3.3 V	-	20	30	mA

1.5 Optical Characteristics 光学参数

TFT LCD Module TFT LCD 模块 VDD= 3.3 V, Ta=25°C

Item 项目		Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	-
Response time 响应时间	Tr+Tf	25℃	-	-	30	35	ms	Note 2
Viewing angle Without ALCF 没有防窥膜的视角范围	Top	θY+	CR ≥ 10	70	80	-	Deg.	Note 4
	Bottom	θY-		70	80	-		
	Left	θX-		70	80	-		
	Right	θX+		70	80	-		
Contrast ratio 对比度		CR	IF=60mA	800	1000	-	-	Note 3
Color of CIE Coordinate (B/L & LCD & CTP) CIE 色度坐标	White	X		-0.05	0.336	+0.05	-	Note1
		Y			0.356			
	Red	X			(0.585			
		Y			(0.374)			
	Green	X			(0.364)			
		Y			(0.571)			
	Blue	X			(0.141)			
		Y			(0.097)			
NTSC 色彩饱和度		-	-	80%	85%	-	-	-
Average Brightness Pattern=white display (B/L & LCD &CTP) 白色显示平均亮度		IV	IF=60mA	800	1000	-	cd/m2	Note1
Uniformity (B/L & LCD&CTP) 均匀性		△B	-	75	-	-	%	9 Points Note1

Note 1: 备注 1：

*1：△B=Brightness(min) / Brightness(max) * 100%

*2：Measurement Condition for Optical Characteristics 光学参数的测量条件:

a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

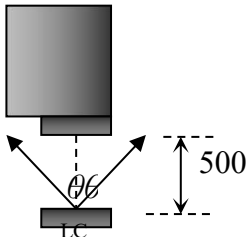
测量环境： 25℃±5℃ / 60±20%R.H，无风，室内亮度低于 10 Lux，典型电流和典型工作频率。

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°).
测量距离：500 ± 50 ㎜ ，(θ= 0°)。

c：Equipment: TOPCON BM-7 fast，(field 1°)，after 10 minutes operation.
测量设备：拓普康 BM-7 色度亮度计（视野 1°）， 十分钟后测量。

d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%
色坐标测量的不确定性±0.01，平均亮度 ± 4%。





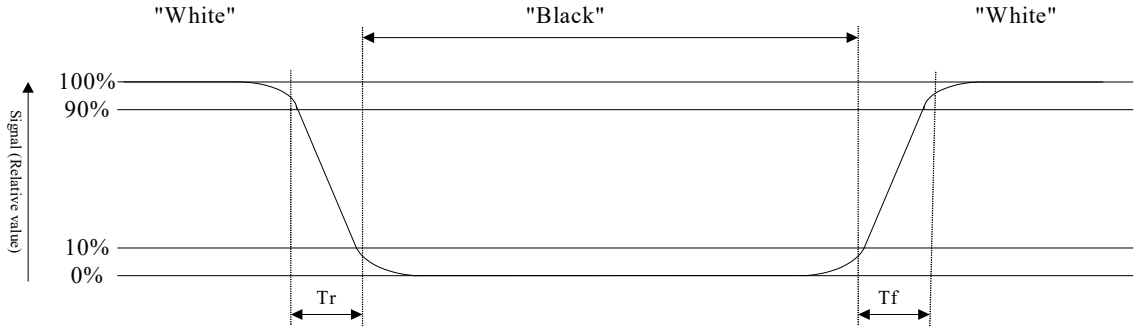
Colorimeter=BM

To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)
使用托普康亮度计 BM-7 在面板中心区域测量，视锥为 1°，十分钟后测量。

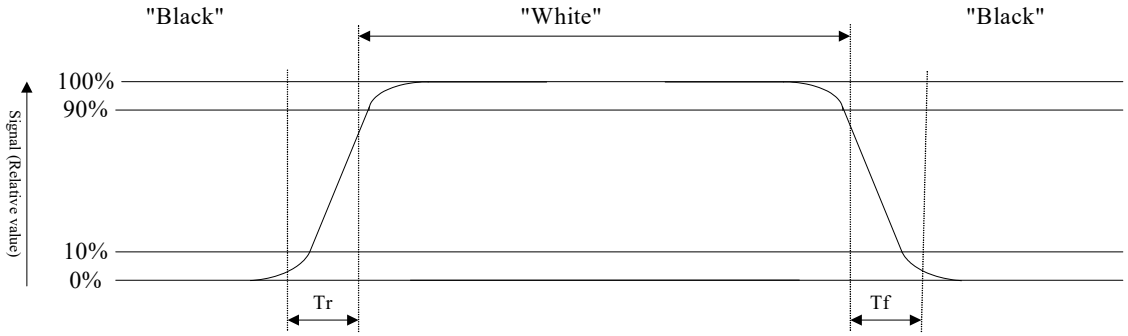
Note2: Definition of response time: 定义响应时间：

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.
当输入信号由 “黑 ”变 “白”（Tf 下降时间）和由 “白 ”变 “黑”（Tr 上升时间）时，分别测量光电探测器的输出信号。响应时间定义为 10%和 90%振幅之间的时间间隔。
Refer to figure as below:请参考下图：

Normally White 常白模式



Normally Black 常黑模式



Note3: Definition of contrast ratio:对比度的定义：

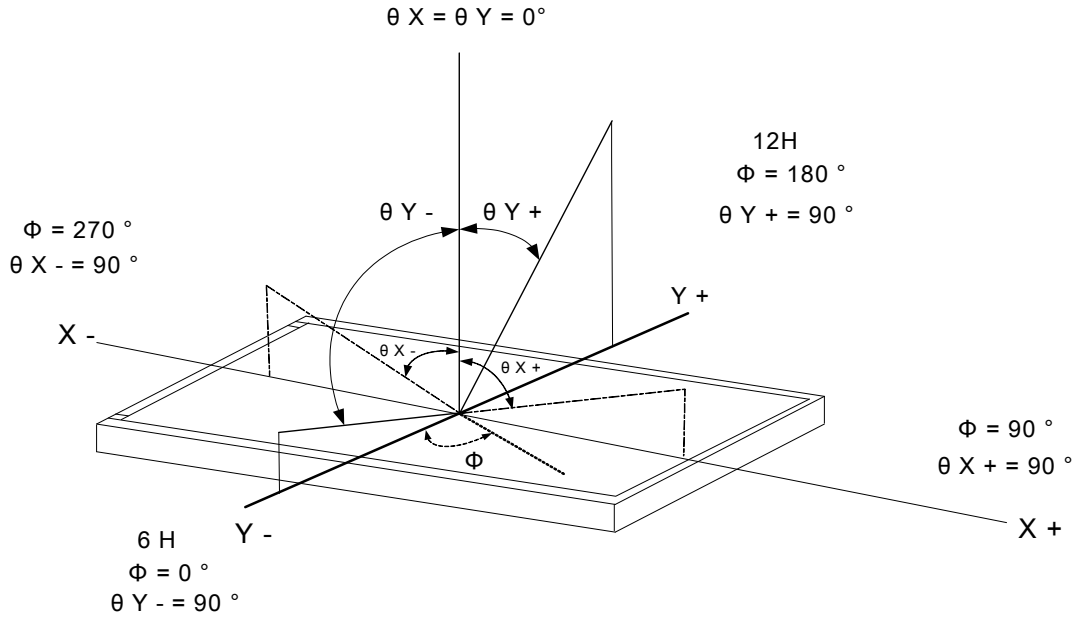
Contrast ratio is calculated with the following formula 对比度的计算公式如下：

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

$$\text{对比度 (CR)} = \frac{\text{显示白色画面时平均表面亮度}}{\text{显示黑色画面时平均表面亮度}}$$

Note4: Definition of viewing angle: 视角的定义：

Refer to figure as below: 参见下图：



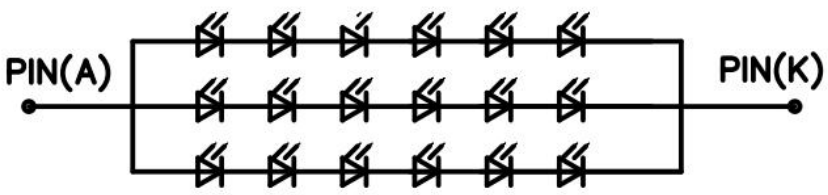
1.6 Backlight Characteristics 背光特性

Item	Symbol	Min.	Typ.	Max.	Unit
Led Driver Power Voltage	VLED	3.0	3.3	12	V
Led Driver Power Current	ILED	-	0.4	-	A
PWM Dimming Freq	FDIM	-	-	2	kHZ
EN threshold	EN ON	1.3	-	-	V
	EN OFF	-	-	0.4	V

Electrical / Optical Characteristics 电子/光学特性

Item 项目	Symbol 符号	Conditions 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位
Forward Voltage 正向电压	VF	IF=60mA	16.2	18	19.8	V
Average Brightness 平均亮度	IV		18000	19000	-	cd/m^2
CIE Color Coordinate CIE 色度坐标	X		0.29	0.31	0.33	-
	Y		0.28	0.30	0.32	
Color 颜色	White 白色					
LED Life Time 寿命	Ta =25℃ IF=60mA 50000 hrs					
Power Dissipation 背光功耗	1080 mW					

Circuit Diagram 电路图、



1.7CTP Characteristics 触摸屏特性

Items.	Specification	Remark
Touch Panel Size	4.3 inch	-
Cap Touch Pannel VDD	3.3V	-
Touch type	True Multi-touch with up to 5 Points of Absolution X and Y coordinates	-
Structure type	G+G	-
Interface	I² C	-
Operation Temperature	-30~80℃	-
Storage Temperature	-30~80℃	-
Control IC	ST1633I	-
Transparency	≥86%	-
Structure	Glass：T =1.1mm	-
	Sensor：T =0.55mm	
I2C address	0x55	-
Outline Dimension	121.82mm*80.64mm*1.85mm	-
View Area	96.04mm*54.86mm	-

1.8 EEPROM Information

1.8.1 EEPROM Number :M24C02-RMN6TP

1.8.2 EEPROM Device Address 7bit :0X50

1.8.3 EEPROM Register Information：

Address	Description	Data	Name/Value(typ.)	Notes
00h	No Data	00h	0	
01h	TFP-Interface	01h	DPI	1: DPI, 2: DSI
02h	CTP-Interface	01h	I2C	0: No CTP, 1: I2C
03h	Manufacturer	53h	S	SM: Smartw in (ASCII)
04h		57h	M	
05h		00h		
06h	Size	04h	4.3 inch	xx.xx inch
07h		03h		
08h	X-Res.(H-Byte)	01h	480 px	
09h	X-Res.(L-Byte)	E0h		
0Ah	Y-Res.(H-Byte)	01h	272px	
0Bh	Y-Res.(L-Byte)	10h		
0Ch	Pixel-Clock(typ.)	09h	9 MHz	xx.xx MHz
0Dh		00h		
0Eh	Color-Depth	18h	24 bit	
0Fh	HBP(H-Byte)	00h	43	
10h	HBP(L-Byte)	2Bh		
11h	HPW	04h	4	
12h	HFP(H-Byte)	00h	8	
13h	HFP(L-Byte)	08h		
14h	VBP(H-Byte)	00h	12	
15h	VBP(L-Byte)	0Ch		
16h	VPW	04h	4	
17h	VFP(H-Byte)	00h	8	
18h	VFP(L-Byte)	08h		
19h	Polarity_Mode	24h	00100100b	Bit0: H_sync_polarity Bit1: V_sync_polarity Bit2: DE_polarity (0: Negative, 1: Positive) Bit3: H_sync _phase(Reserve) Bit4: V_sync _phase(Reserve) Bit5: DE_phase (0: Rising edge, 1: Falling edge) Bit6: Pixel_invert Bit7: DE_mode (0: DE enabled,1: Combined Sync)
1Ah	Rotation	00h	00000000b	Bit 0: Display Mirror X Bit 1: Display Mirror Y Bit 2: Display Sw ap X/Y Bit 3: Reserved, 0 Bit 4: Touch Mirror X Bit 5: Touch Mirror Y Bit 6: Touch Sw ap X/Y Bit 7: Reserved, 0
1Bh	Reserve	00h	0	
1Ch-FFh	No Data	00h	0	

2. MODULE STRUCTURE 模块结构

2.1 Counter Drawing 外形图纸

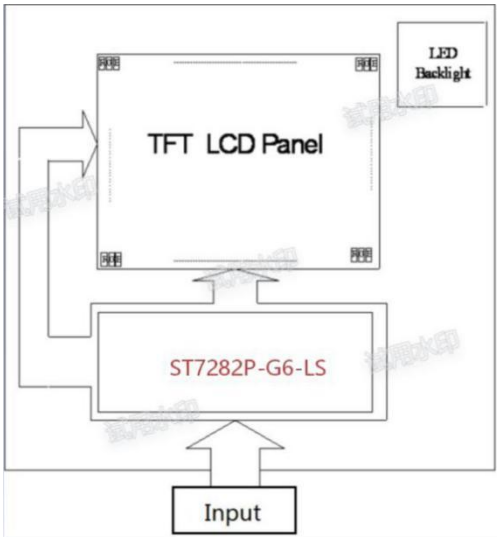
2.1.1 LCM Mechanical Diagram

LCM 外形图

* See Appendix 见附录

2.1.2 Block Diagram

一个 IC:



2.2 Interface Pin Description 接口说明

PIN NO. 接口编号	SYMBOL 符号	Description 说明
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	+3V3 BKL	3.3V Power Input for BKL
6	+3V3 BKL	3.3V Power Input for BKL
7	+3V3 BKL	3.3V Power Input for BKL

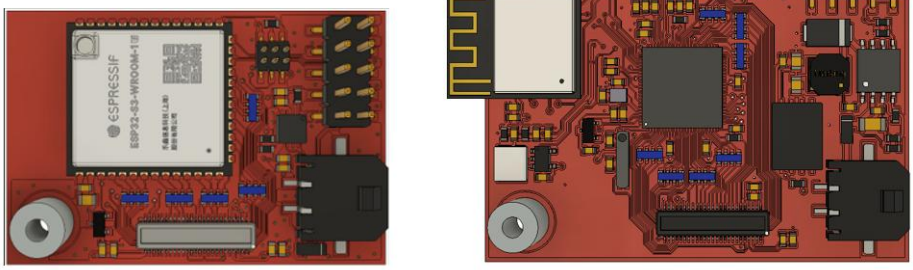
8	+3V3 BKL	3.3V Power Input for BKL
9	PWM BKL	Back light PWM Control signal
10	+3V3 TFT	3.3V Power Input for TFT
11	GND	Ground
12	R0	Red data signal
13	R1	Red data signal
14	R2	Red data signal
15	R3	Red data signal
16	R4	Red data signal
17	R5	Red data signal
18	R6	Red data signal
19	R7	Red data signal
20	G0	Green data signal
21	G1	Green data signal
22	G2	Green data signal
23	G3	Green data signal
24	G4	Green data signal
25	G5	Green data signal
26	G6	Green data signal
27	G7	Green data signal
28	B0	Blue data signal
29	B1	Blue data signal
30	B2	Blue data signal

31	B3	Blue data signal
32	B4	Blue data signal
33	B5	Blue data signal
34	B6	Blue data signal
35	B7	Blue data signal
36	GND	Ground
37	VSYNC	Vertical Sync input for TTL mode.
38	HSYNC	Horizontal Sync input for TTL mode.
39	DE	Data input enable applied to the RGB.
40	GND	Ground
41	PCLK	Clock signal for data latching and internal.
42	GND	Ground
43	MODE(STDBY)	Standby mode, Normally pull high.
44	TFT-RESET	TFT Reset Pin
45	TP-RST	CTP Reset Pin
46	TP-INT	INT Output
47	TP_SDA/EEPROM-SDA	TP I2C Data/EEPROM I2C Data
48	TP_SCL/EEPROM-SCL	TP I2C Clock/EEPROM I2C Clock
49	+3V3 CTP	3.3V Power Input for CTP
50	GND	Ground

Recommended matched connector :DF23C-50DP-0.5V

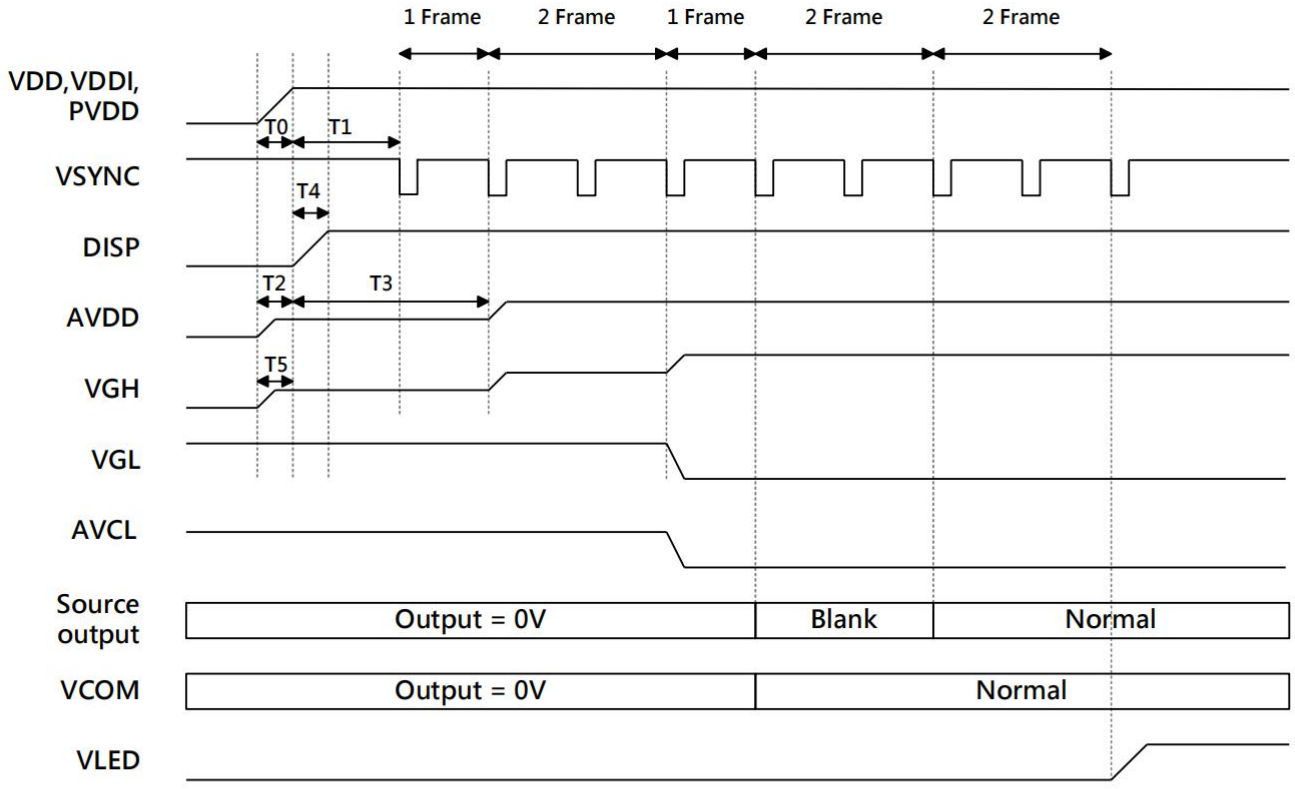
Recommended driving boards:

- ESoPe :SLD_C_W_S3
- ESoPe :SLD_C_W_P4_C6



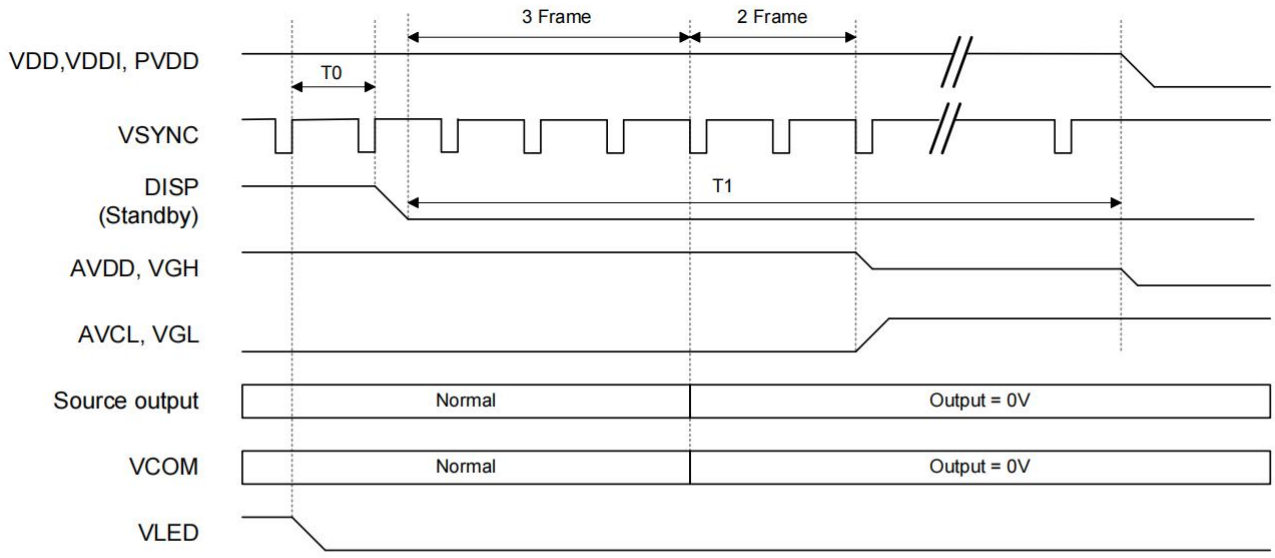
2.3 Timing Characteristics 时序

2.3.1 Power on sequence 上电时序



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

2.3.2 Power off sequence 下电时序



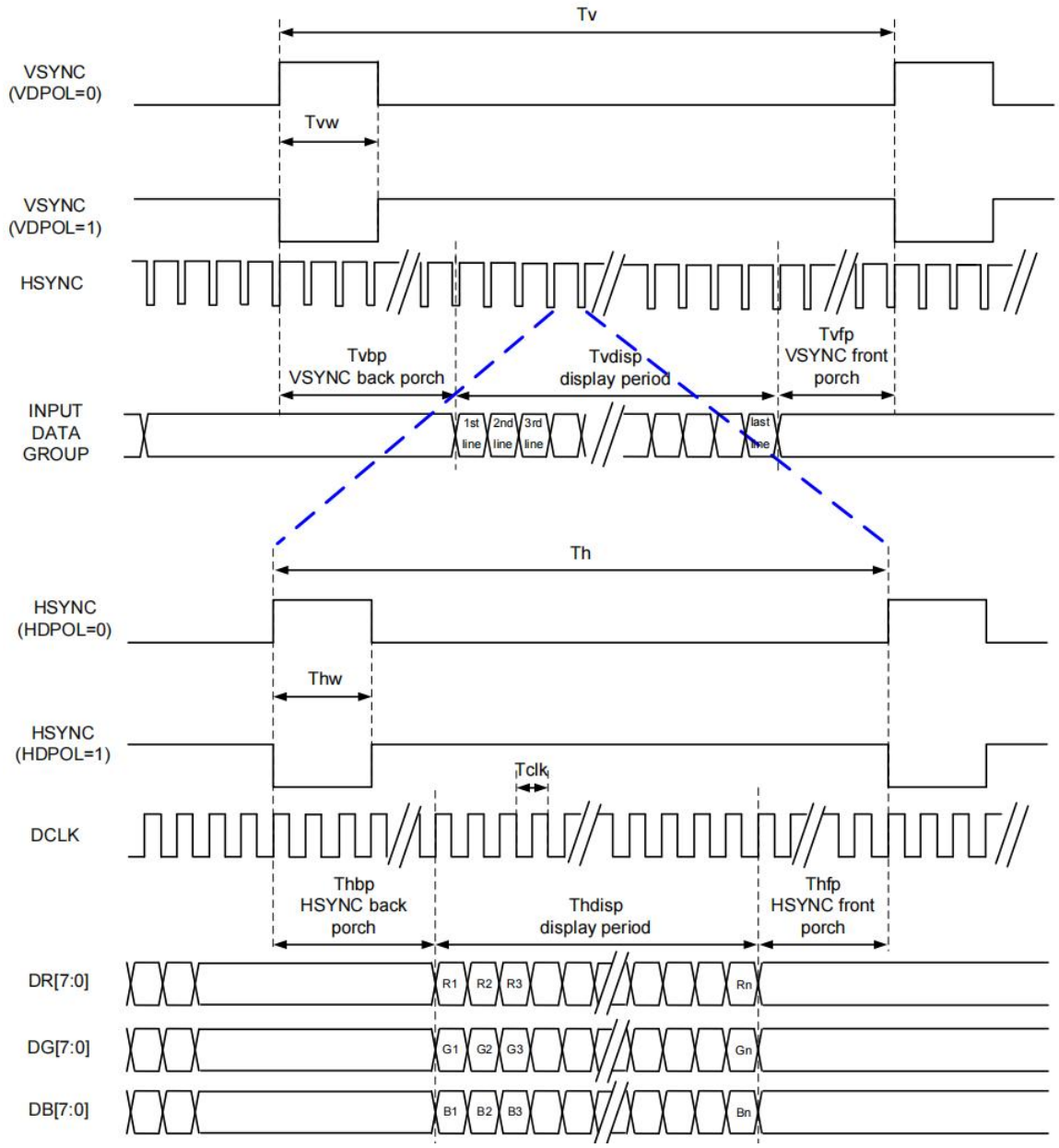
Item	Description	Min. Time
T0	Time from backlight power off to DISP="L"	1*Frame
T1	Time from DISP="L" to LCM Power off	5*Frame

2.2.3 RGB Interface

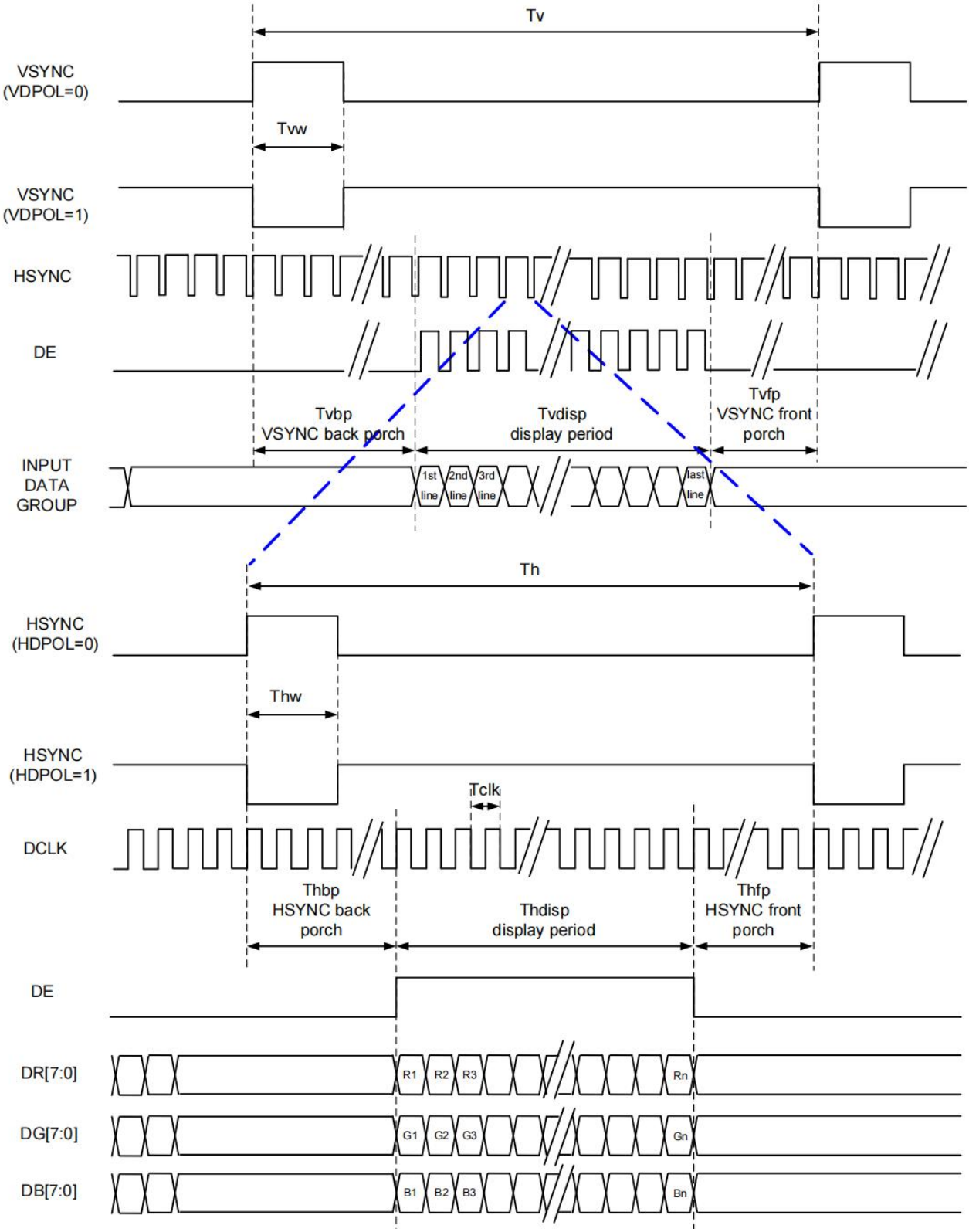
RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side.

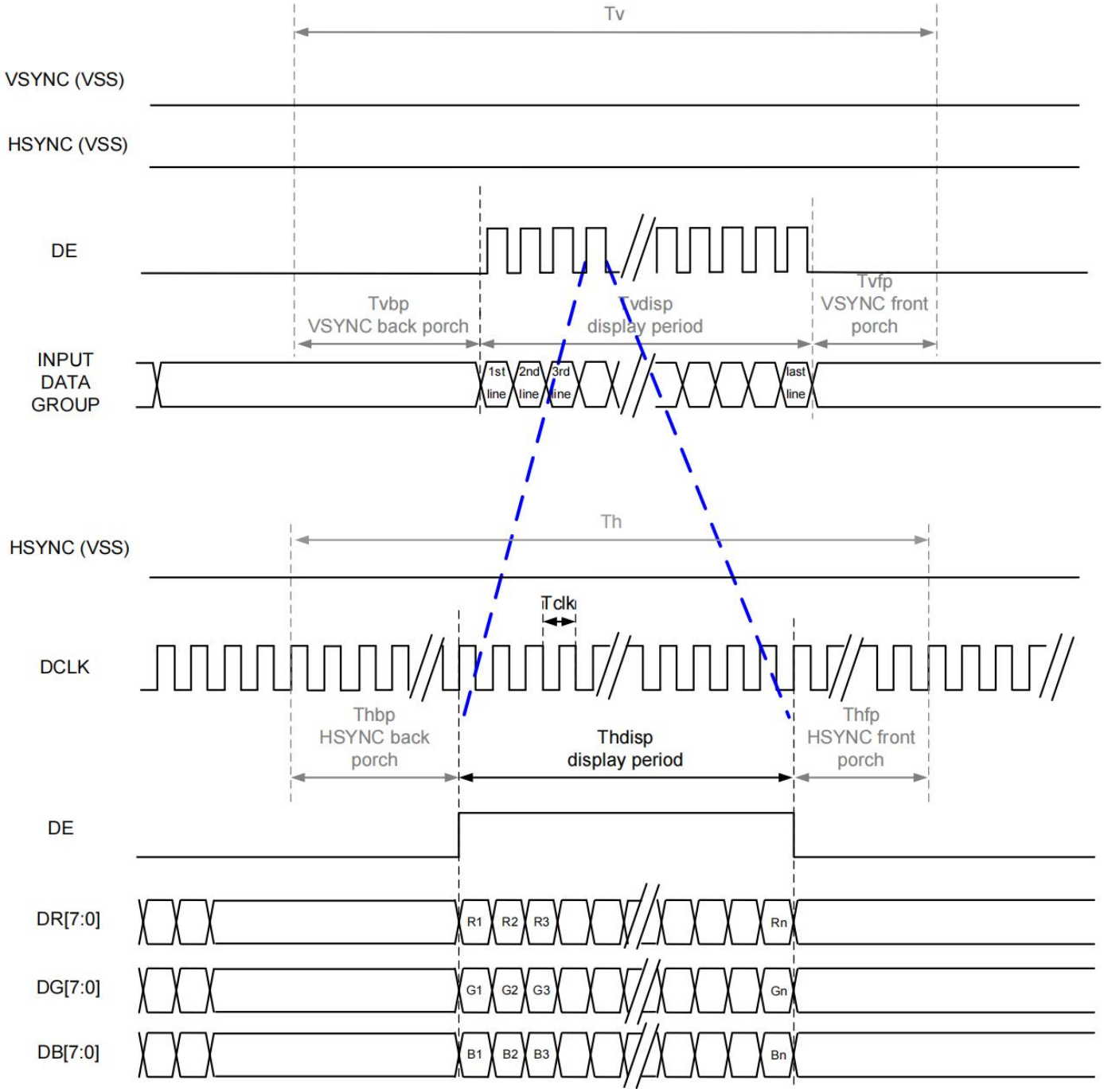
2.2.4 SYNC-Mode



2.2.5 SYNC-DE Mode



2.2.6 DE Mode


Tv
VSYNC (VSS)
HSYNC (VSS)
DE
Tvbp
VSYNC back porch
Tvdisp
display period
Tvfp
VSYNC front
porch
INPUT
DATA
GROUP
1st
line
2nd
line
3rd
line
last
line
Th
HSYNC (VSS)
Tclk
DCLK
Thbp
HSYNC back
porch
Thdisp
display period
Thfp
HSYNC front
porch
DE
DR[7:0]
R1
R2
R3
Rn
DG[7:0]
G1
G2
G3
Gn
DB[7:0]
B1
B2
B3
Bn

2.2.7 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

480RGB X 272 Resolution Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp	-	480	-	DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	HSYNC	
	Display Period	Tvdisp	-	272	-	HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	By V_BLANKING setting
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

3. INSPECTION SPECIFICATION-- General Inspection Standard for Industrial TFT

检验标准——工控 TFT 产品通用出货检验标准

3.1.Purpose ： 目的

Ensure that TFT product inspection has standards to follow, and ensure that product shipments meet customer needs.

确保工控TFT产品检验工作有标准可依，确保工控产品出货满足客户需求。

3.2.Subject range ： 适用范围

3.2.1 This standard applies to all of SMARTWIN industrial TFT products, including panels, CFOG, modules, modules +Lens and other forms.

本标准适用于骏成所有工控TFT产品，包含面板、CFOG、模组和模组+Lens 等形式。

3.2.2 This standard is used in combination with the Product Inspection Standard Card (hereinafter referred to as the "Inspection card"), and the items specified on the inspection card shall be executed according to the inspection card.

本标准和“工控产品检验标准卡”（以下简称为“检验卡”）结合使用，检验卡上有规定的项目按 检验卡执行。

3.2.3 When exceptions not defined in this document are encountered in actual work, feedback is given to QE engineers for handling.

实际工作中遇到本准确中未定义的异常时，反馈QE工程师处理。

3.3.Definitions and abbreviations：定义及缩略语

None 无

3.4. Responsibility：职责

3.4.1 QE：As the owner of this standard, responsible for the development, maintenance and implementation of this standard supervision.

QE 为本标准的 owner，负责本标准的制定、维护以及执行的监督。

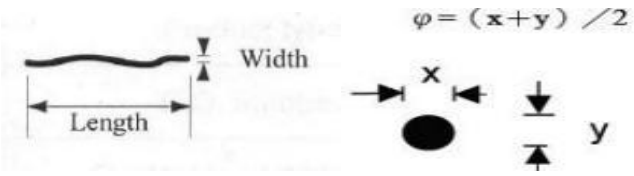
3.4.2 Manufacturing: Responsible for the implementation of this standard and feedback.

制造:负责本标准的执行以及意见反馈。

3.5.Working procedures and contents：工作程序和内容

3.5.1 LCD Dimensional definition of point defect and linear defect

点状缺陷、线状缺陷的尺寸定义



3.5.2 Environmental conditions and precautions：环境条件及注意事项

3.5.2.1 Viewing distance: Distance between TFT and inspector's eyes 30cm±5cm.

观察距离：目视距离30cm±5cm

3.5.2.2 Viewing Angle：U/D: 45°/45°, L/R: 45°/45°.

检视角度：U/D: 45°/45°, L/R: 45°/45° 。

3.5.2.3 Ambient conditions：Room temperature(23±2)℃ Humidity: (55±10)％RH

检验环境：温度:(23±2)℃ 湿度:(55±10)％RH；

3.5.2.4 Illumination intensity：Lighting test:＜200Lux; Appearance test:800-1200 Lux

光照亮度: 电测:＜200 Lux；外观:800-1200 Lux；

3.5.2.5 Proving time：A single screen should not exceed 5S

检验时间：单个电测画面不超过 5S（外观暂无定义）。

3.5.3 Inspection methods and precautions 检验方法及注意事项

3.5.3.1 (ND filter 5%) : ND filter distance from the product surface 1cm~3cm, electrical brightness: < 200 Lux, visual distance 30cm±5cm.

遮光片使用方法（ND filter 5%）：ND filter距离产品表面 1cm~3cm,电测亮度:＜200 Lux,目视距离30cm±5cm.

3.5.3.2 Size determination 尺寸判定

The size of point and line defects is determined by the filinka measurement, assisted by the eyepiece.

点缺陷、线缺陷的尺寸大小以菲林卡测量为准，目镜为辅助。

3.6 Defect Level 缺陷等级

3.6.1Major Defect AQL： 0.65 ； Minor Defect AQL： 1.5

3.5.4 Inspection items and standards

3.5.4.1 Power on display defect inspection standard

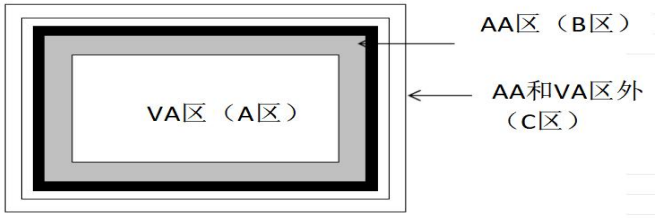
Inspection Item 检查项目		**Criterion** 判定基准		**Phenomenon description** 现象说明
Category 类别	**Defect** 缺陷	**Spec** 规格	**Allowable number** 允许个数	
Function defect 功能缺陷	Bright line/dark line/Thin bright line/thin dark line/crossed line		Not allow	\
	Screen flicker	Outside of Flicker, visible flicker to naked eye	Not allow	\
	No display/ chaotic display/ half display/dark display		Not allow	\
	Color anomaly	Visible to naked eye,Color coordinate test failed	Not allow	\
	Wrong viewing angle	Inconsistent with design	Not allow	\
	Liquid crystal bubble, liquid crystal leakage		Not allow	\
	Shutdown image residue/The image remains when the screen is switched	>5S	Not allow	After shutdown, there is still a residue of the screen display, or after switching the screen, there is still a residue of the previous screen
	Reverse screen/flip	\	Not allow	The picture shows upside down or reverse left and right
	BL is not on/Some lights are not on /BL is dark	\	Not allow	\
	The NTC resistance is abnormal	Test Alarms	Not allow	NTC is a thermistor, Which is in the backlight and use it at the customer side
	Electricity Test	Test Alarms	Not allow	\
	The TP function is lost or the linearity is poor	\	Not allow	\

Pixel defect **像素点缺陷**	Bright dot	Φ≤4dot		Allow	The pixel is out of function due to open or short circuit
	Dark dot	≤5”	1/2dot≤Φ≤1dot	2	
		5″ ～7″ Including 7″		2	
		＞7”		3	
		Continuous dark spot is not allowed, dark spot spacing should≥5mm			
Dot defect **点缺陷**	Black/ white dots/Foreign bodies /BL white dots/polarizer bubbles (white dots), etc	≤5”	Φ≤0.1mm	Negligible	For the plate-like foreign material of the polarizer and the bubble of polarizer: as shown in the figure,Firstly judge the size according to the dot defect; If the size is out of specification, then use ND filter 5% cover,if passed and at the same time other screens are not visible,which would be allowed.  material intrusion or surface defects, affects the transmission of light, but did not affect the electrical transmission .
			0.10<Φ≤0.2mm	3 （spacing≥ 5mm） （Interval≥ 5mm）	
			0.2mm<Φ	0	
		5 ″ ～ 7 ″ including 7 ″	Φ≤0.2mm	Negligible	
			0. 20<Φ≤0.3mm	3 （interval≥ 5mm）	
			0.3mm<Φ	0	
		＞7”	Φ≤ 0.2 mm	Negligible	
			0.2 mm< Φ≤0.40 mm	3 （interval≥ 5mm）	
			0.40 mm <Φ	0	
line defect **线类缺陷**	Polarizer bubbles/scratches/line defect//BL Foreign body /LCD scratch/BL scratch	W≤0.03mm		Negligible	Polarizer scratches: Use ND5% cover, if not visible，judged OK . B/L scratch detection Angle is: Up/down/left/right 45 °, if not visible,judged ok
		0.03＜W≤0.05mm， L≤3.0mm		3 （spacing≥ 5mm）	
		0.05 mm＜W， L>3.0mm		0	

Light leakage 漏光	Pixel leakage	The positive Angle is not visible would be judged as ok	Not allow	This is due to the incomplete overlap of CF/TFT pixels, which generally results in a white tint visible at an oblique angle in black screen.
	Light leakage during backlight assembly	The product with an iron frame was inspected at a 45 ° angle, and it was found that there was light leakage at the edge of the iron frame when lighted within the viewing angle	Not allow	The backlight light is exposed through direct/reflected light from the gap between the LCD and the backlight, as well as the upper iron frame
Surface defect 面缺陷	Black and white clumps (containing core)/Mura/water stains and white spots/whitening of edges and corners/PI scratches/LCD dirt/film marks, etc	R/G/B/ is not visible in white screen The black screen is not visible after being covered with 5%ND Filter	allow	Surface defects: Flake or block shape defects. The definition of "core": scattered fragments with a bright or dark dots
Backlight diagonal stripes 背光斜纹	Backlight diagonal stripes	Plz refer to the limited sample		Regular stripes caused by the angle of the backlight film

3.5.4.2 Appearance inspection standard

3.5.4.2.1 Module area definition



Zone A ： Visual area (defined according to product drawings)

Zone B ： Within the observation area between Zone A and the metal frame（Including CTP black spray paint area）

Zone C ： The entire LCD module except for Zone A and Zone B (including FPC, metal frame, and LCD module back)

Defect 缺陷	Position 位置	Inspection standard 检验标准			Phenomenon description 现象说明
		Spec 规格		Standard 标准	
Bubbles white spots 气泡、白点	A	≤5”	Φ <0.3mm	Allow	\
		5 ″ ～7 ″ 含 7 ″	0.40 mm <Φ	Allow	\
		>7”	0.50 mm <Φ	Allow	\
	B/C	\		Allow	\
line defect 线行伤	A	0.03＜W≤0.05mm， L≤3.0mm		Allow	
	B/C	Scratches can be seen but there is no sensation when touched.		Allow	Touch the scratch location with finger
Concave/Convex point 凹凸点	A	0.30 mm <Φ		Allow	\
	B /C	\		Allow	\
Defective protective film 保护膜伤	ALL	A dead break that causes the protective film to curl		Not allow	\
		Stabbed		Not allow	\
		Friction mark /scratches		Allow	\
Bubble in protective film 保护膜气泡	A	Middle bubble (no foreign body inside)		Allow	\
Misalignment during polarizer assembly 偏光片贴附偏移	A	/		Not allow	\
	B	Not beyond the LCD edge, covering the VA area		Allow	\

Dirt on surface **表面脏污**	A	Can be wiped	Allow	\
	B/C	Indelible marks (hand prints, sanding marks, watermarks, stains)	Allow	\
FPC damage **FPC 伤**	wiring	Wiring dead broken	Not allow	
		Line crease	Allow	
		The jacking width should not exceed 1/3 of the line width	Allow	The stab wounds were observed and compared under CCD The phenomenon of dead folding is similar
	Out of wiring area	Stabbed	Allow	
	FPC substrate Stabbed	The stabbed width of the wiring on the substrate is less than 1/3 of the width of the wiring.	Allow	
		The substrate is outside the wiring area	Allow	
	FPC Component	Components Warping, pseudo soldering, welding deficiency	Not allow	\
		Components Lack,extra, wrong	Not allow	\

4.RELIABILITY TEST 可靠性测试

<table>
<tr><th>NO.</th><th>Test Item
测试项目</th><th>Test Condition
测试条件</th><th>Test Criteria
测试标准</th></tr>
<tr><td>1</td><td>High Temperature Operation Test
高温工作</td><td>Keep in +80 ±2°C 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td><td rowspan="8">1. Leakage liquid crystal, liquid crystal polarization;
2. Directional deterioration, unable to display normally or display difficult to identify;
3. Full display current ≥ 2 times the initial value;
4. The display is abnormal.
5. The polarizer failure does not allow warping, fading, bubbles, curling, water lines and other phenomena (not counting defects within 1mm from the edge of the polarizer).
6.Before the experiment, Remove the protective film on the product surface
7. After the experiment, the screen glue and polarizer did not change color.
1.漏液晶、液晶极化；
2.定向劣化，无法正常显示或显示难以辨认；
3.全显示电流≥初始值的2倍；
4.显示异常；
5.偏光片失效不允许有曲翘、褪片、气泡、卷边、水纹等现象(距偏光片边缘1mm以内缺陷不计);
6.实验前，需要去掉产品表面保护膜
7.实验后贴合屏 胶水无变色，偏光片无变色。</td></tr>
<tr><td>2</td><td>Low Temperature Operation Test
低温工作</td><td>Keep in -30 ±2°C 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>3</td><td>High Temperature Storage Test
高温存储</td><td>Keep in +80 ±2°C 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>4</td><td>Low Temperature Storage Test
低温存储</td><td>Keep in -30 ±2°C 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>5</td><td>High Temperature / High Humidity Storage Test
高温高湿存储</td><td>Keep in +60 °C / 90% R.H duration for 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.
(Excluding the polarizer)</td></tr>
<tr><td>6</td><td>Temperature cycling Storage
温度循环存储</td><td>-30°C → +25°C → +80°C → +25°C
(30mins) (5mins) (30mins) (5mins)
30 Cycle
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>7</td><td>UV irradiation Test
UV光照实验</td><td>UV irradiation 60°C85%RH light intensity 1.0/m² 240 hrs.</td></tr>
<tr><td>8</td><td>ESD Test
ESD测试</td><td>
<table>
<tr><th>Release position</th><th>Discharge</th><th>Class</th><th>Discharge</th><th>Class</th></tr>
<tr><td>Air Discharge Discharge 5 times</td><td>+/- 4 KV</td><td>A</td><td>+/- 8KV</td><td>B</td></tr>
<tr><td>Contact Discharge Discharge 5 times</td><td>+/- 2 KV</td><td>A</td><td>+/-4 KV</td><td>C</td></tr>
</table>
Temperature ambiance : 15°C～35°C
Humidity relative : 30%～60%
Energy Storage Capacitance(Cs+Cd) : 150pF±10%
Discharge Resistance(Rd) : 330Ω±10%
Discharge, mode of operation :
Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)</td><td>A. The performance is normal within the scope of technical requirements, and the result is judged to be qualified;
B. The function is temporarily reduced or lost, but can recover by itself, and the result is judged as qualified;
C. The function is temporarily reduced or lost, requiring the signal to be restored after Reset, no special requirements, the result is judged as qualified;
D. The function is temporarily reduced or lost, and it is required to restart the system power supply to recover, no special requirements, the result is judged as qualified;
E. Cause irrecoverable function reduction or loss, unqualified.
A 在技术要求范围内的性能正常，结果判为合格；
B. 功能暂时降低或丧失，但可自行恢复，结果判为合格；
C. 功能暂时降低或丧失，要求信号 Reset 后恢复，无特殊要求，结果判为合格；
D. 功能暂时降低或丧失，要求重启系统电源后恢复，无特殊要求，结果判为合格；
E. 造成不可恢复的功能降低或丧失，不合格。</td></tr>
</table>

<table>
<tr><td>10</td><td>Vibration Test
(振动试验)</td><td>1.Sine wave 10～55 Hz frequency (1 min/sweep)
2.The amplitude of vibration :1.5 mm
3. Each direction (X、Y、Z) duration for 2 Hrs</td><td></td></tr>
<tr><td>11</td><td>Drop Test
(跌落试验）</td><td><table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>M　< 10</td><td>100</td></tr><tr><td>10 ~ 20</td><td>80</td></tr><tr><td>20 ~ 30</td><td>70</td></tr><tr><td>30 ~ 40</td><td>60</td></tr><tr><td>40 ~ 50</td><td>50</td></tr></table>Drop Direction :※1 corner / 3 edges / 6 sides each 1time</td><td></td></tr>
</table>

5. PRECAUTION RELATING PRODUCT HANDLING 使用注意事项

Please pay attention to the following items when you use the LCD Modules:

使用液晶显示屏时注意以下事项：

5.1 Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.

请勿扭曲或弯曲模块，并防止在组装过程中对显示模块施加不适当的外力。

5.2 Adopt measures for good heat radiation. Be sure to use the module with in the specified temperature.

采取良好的热辐射措施，请确保在规定温度下使用。

5.3 Avoid dust or oil mist during assembly.

组装时避免灰尘和油污

5.4 Following the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.

请遵循正确的电源时序进行操作。切勿使用无效信号，否则会导致不正常关机并损坏模块。

5.5 Less EMI: it will be more safety and less noise.

减少电磁干扰使模组使用更安全且噪音更小。

5.6 Please operate module in suitable temperature. The response time & brightness will drift by different temperature.

请在合适的环境下操作模块，响应时间和亮度会因环境不同而变化。

5.7 Avoid to display the fixed pattern (exclude the white pattern) in a long period, otherwise, it will cause image stains.

避免长时间显示固定画面，否则会造成图像残留。

5.8 Be sure to turn off the power when connection of disconnecting the circuit.

连接或断开电路时，请务必关闭电源。

5.9 Polarizer scratches easily, please handle it carefully.

偏光片容易划伤，请小心操作。

5.10 Display surface never likes dirt of stains.

请不要让显示屏表面沾灰尘和污渍。

5.11 A dew drop may lead to destruction. Please wipe off and moisture before using module.

请在使用前擦去水分，进水会导致产品损坏。

5.12 Sudden temperature changes cause condensation, and it will cause polarizer damaged.

偏光片会因温度骤变导致损坏。

5.13 High temperature and humidity may degrade performance. Please do not expose the module

to the direct sunlight and so on.
请勿将模块直接暴露在阳光下，否则高温和潮湿可能会降低性能。

5.14 Acetic acid or chlorine compounds are not friends with TFT display module.
醋酸或氯化合物不适合 TFT 显示模块。

5.15 Static electricity will damage the module; please do not touch the module without any grounded device.
请勿在没有任何接地设备的情况下触摸模块，否则静电会导致模块损坏。

5.16 Do not disassemble and reassemble the module by self.
请勿自行拆卸和重新组装模块。

5.17 Be careful do not touch the rear side directly.
注意不要直接触摸背面。

5.18 Not strong vibration or shock. It will cause module broken.
如果有强烈振动或冲击会导致模块损坏。

5.19 Storage the modules in suitable environment with regular packing.
在规定包装与合适的环境下存放模块。

5.20 Be careful or injury from a broken display module.避免因显示模块破损造成的伤害。

5.21 Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity of other function issue.
请避免在模块表面（正面或背面）施加压力，这会导致显示不均匀或其他功能问题。

5.2.2 To control temperature and time of soldering is 320±10℃and 3-5 sec.
焊接温度和时间控制：320±10℃，3～5 秒。

5.3.1 Store the panel or module in a dark place where the temperature is 25℃ ±5℃ and the humidity is below 65% RH.
面板或模组应避光存放，储存温度：25℃ ±5℃，相对湿度低于 65% RH

5.3.2 Do not place the module near organics solvents or corrosive gases.
模组不可放置在有机溶剂或腐蚀性气体附近。

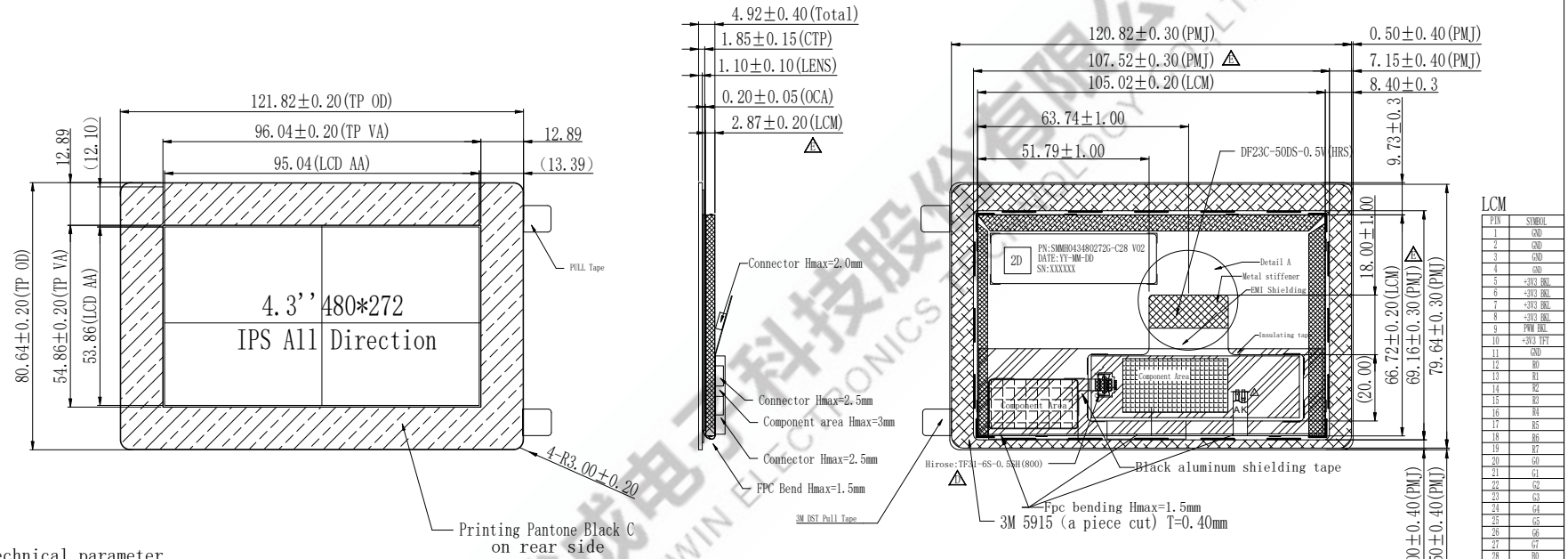
5.3.3 Do not crush , shake , or jolt the module.
禁止挤压、摇晃、剧烈颠簸冲击模组。

5.4.1 Applicable warrant period
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
在正常使用及储存条件下，保修期为自出货之日起 13 个月。

5.4.2 Unaccepted responsibility

This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in nuclear power control equipment , aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.

REV	REVISION RECORD	DATE
⚠	ACCORDING TO CUSTOM'S SPEC	2024-11-21
⚠	Add Edging Tape	2025-1-20
⚠	FPC pads increase alignment lines	2025-3-31
⚠	Change the CTP connector model、Remove Edging Tape、Change IC model	2026-8-25
⚠	Add Edging Tape 、Reduce the size of the foam tape、Replace LED light	2026-08-26



LCM

PIN	SYMBOL
1	GND
2	GND
3	GND
4	GND
5	+3V3 BKL
6	+3V3 BKL
7	+3V3 BKL
8	+3V3 BKL
9	PWM BKL
10	+3V3 TFT
11	GND
12	R0
13	R1
14	R2
15	R3
16	R4
17	R5
18	R6
19	R7
20	G0
21	G1
22	G2
23	G3
24	G4
25	G5
26	G6
27	G7
28	B0
29	B1
30	B2
31	B3
32	B4
33	B5
34	B6
35	B7
36	GND
37	VSYNC
38	HSYNC
39	DE
40	GND
41	PCLK
42	GND
43	MODE(STDBY)
44	TPT-RESET
45	TP-RST
46	TP-INT
47	TP-SDA/EEPROM-SDA
48	TP-SCL/EEPROM-SCL
49	+3V3 CTP
50	GND

CTP Technical parameter

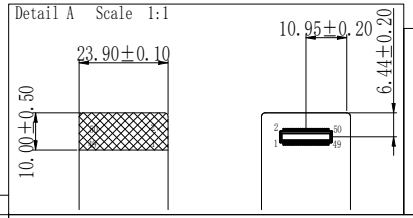
1. COVER GLASS+SENSOR+FPC G+G Total thickness：2.0±0.15mm;
2. OPERATING VOLTAGE:IIC :VDD 3.3V;
3. Transmittance:≥86%
4. Surface hardness:≥6H
5. Undeclared tolerance：±0.2
6. OPERATING TEMPERATURE:-30℃~+80℃，≤80%RH
7. STORAGE TEMPERATURE:-30℃~+80℃，≤85%RH
8. ROHS
9. Glass porometer：CS>=500MPa，DOL>=10um,

Note：CN1 Recommended Matched connector DF23C-50DP-0.5V(HRS)

TP Connector:Hirose:TF31-6S-0.5SH(800)

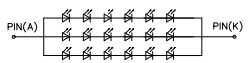
CTP

PIN	SYMBOL
1	TP-RST_3.3V
2	TP-INT_3.3V
3	TP-SDA_3.3V
4	TP-SCL_3.3V
5	VDD3.3V
6	GND



BL Lifetime :50K hours

BL CIRCUIT:



IF:60mA (Const)
VF:16.2V(MIN)-18V(TYP)-19.8V(MAX)
LCM Brightness:1000cd/㎡ (typ)

CONFIRM ALL TYPE DRAWINGS OF THIS AND PASS BACK!

OPERATING VOLTAGE:3.3V	OPERATING CURRENT: --
DISPLAY TYPE: Normally black	VIEW DIRECTION:Free
LCD Resolution:480 (H) RGB× 272(V)	CTP Interface:I²C
LCD CONTROLLER:ST7282P-G6-LS ⚠	CTP CONTROLLER:ST1633I
BACK LIGHT:If=60mA,Vf=18V(typ)	
OPERATING TEMPERATURE:-30℃ TO 80℃(240hrs)	STORAGE TEMPERATURE:-30℃ TO 80℃(240hrs)
DEFAULT TOLERANCE: ±0.2	ROHS STANDARD:YES

江苏骏成电子科技股份有限公司
JIANGSU SMARTWIN ELECTRONICS TECHNOLOGY Co.,LTD

TITLE	Module diagram	CUSTMER NUMBER	-	REV	E
DES'D BY	Hong Kangkai	PRODUCT MODEL	SMMH043480272G-C28	UNIT	mm
CHK'D BY		SERIAL NUMBER	--	DATE	2026-08-26
APPROVED		SCALE	1:1	NO.	1/1

FORMAT(6)