

SPECIFICATION FOR AMOLED Module

MODULE No:	ID-017VGOSN010-C006A
CUSTOMER:	

I DISPLAY	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

[illegible]

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* **Description**

This is a color active matrix AMOLED module using Low Temperature Poly-silicon Thin Film Transistors as active switching devices. This module has a 1.73 inch diagonally measured active area with 466 horizontal by 466 vertical pixel arrays. Each pixel is divided into RED and GREEN dots, or BLUE and GREEN dots, and two pixels share RED or BLUE dots which are arranged in vertical stripe and this module can display colors.

* **Features**

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	Φ 43.76 (1.73 inch)	mm	
Display Color	16.7M	-	
Number of pixels	466(RGB)*466	dots	
Viewing angle	ALL	o'clock	
Controller IC	CO5300	-	
Touch Controller IC	CST820(On cell)	-	
LCM Interface	QSPI	-	
Display mode	AMOLED	-	
Operating temperature	-10~+60	℃	
Storage temperature	-20~+70	℃	

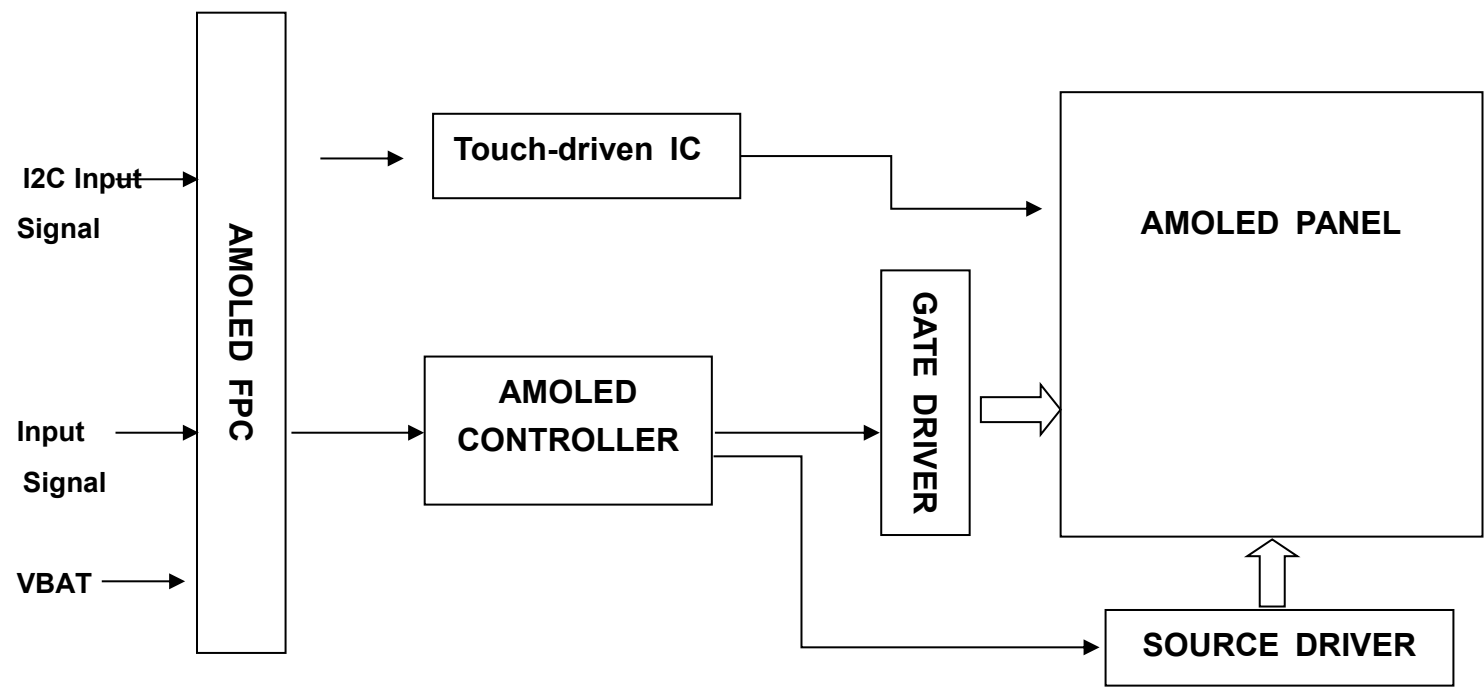
* **Mechanical Information**

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		48.4		mm	LENS OD
	Vertical(V)		48.4		mm	LENS OD
	Depth(D)		2.21		mm	OLED+LENS
Weight			9		g	ALL

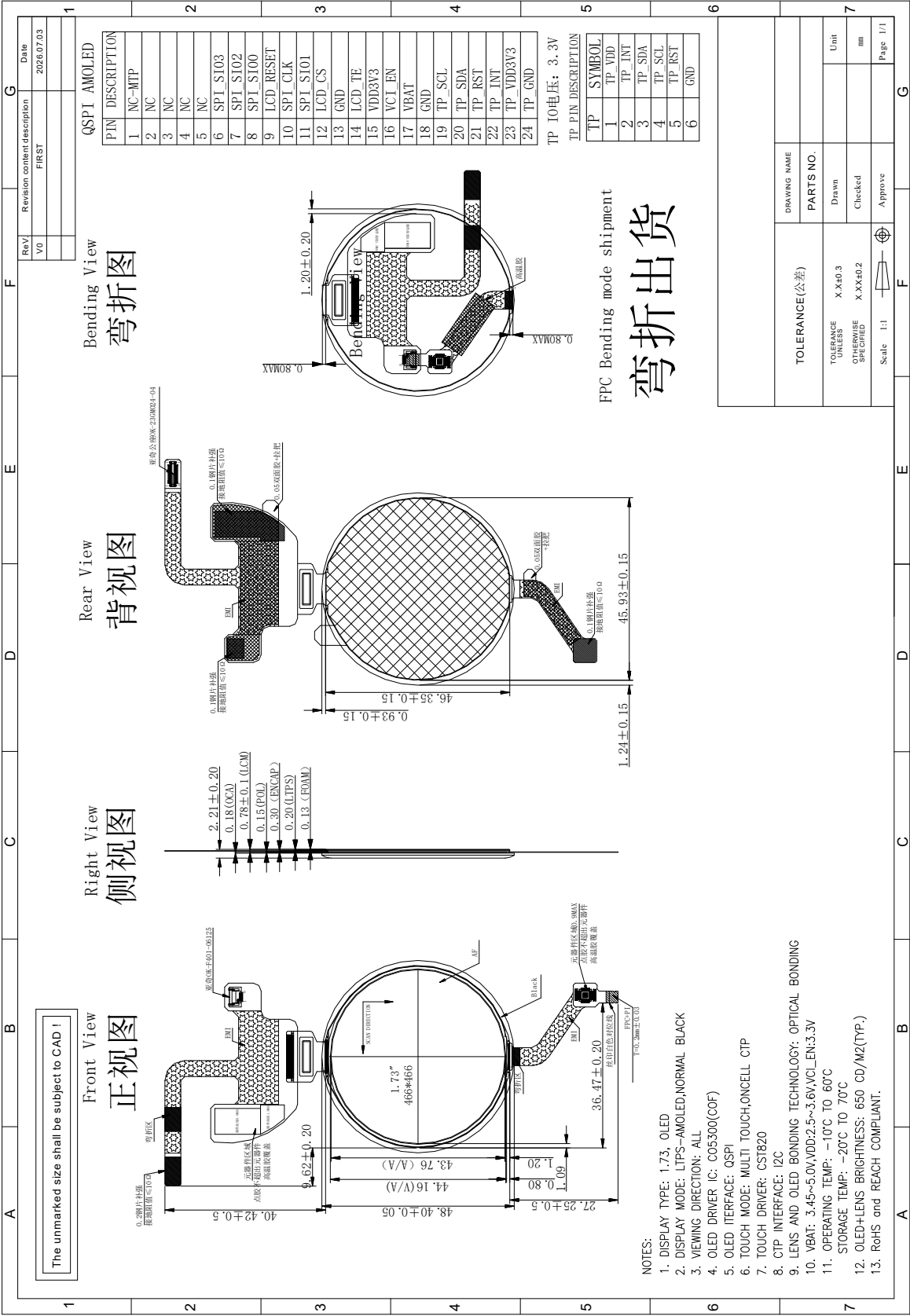
LENS Features

General Information Items	Specification	Unit	Note
	Main Panel		
Material	Glass	-	
Surface hardness	≥6H	-	
Surface treatment	AF	-	

1. Block Diagram



2. Outline dimension



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3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	NC/MTP	NC	
2	NC	NC	
3	NC	NC	
4	NC	NC	
5	NC	NC	
6	QSPI_SI03	Serial Data Input in Quad-SPI	I
7	QSPI_SI02	Serial Data Input in Quad-SPI	I
8	QSPI_SI00	Serial Clock Input in Quad-SPI	I
9	LCD_RST	Display driver reset, must be applied to properly initialize the chip. Signal is active low.	I
10	QSPI_CLK	Serial Clock Input in Quad-SPI	I
11	QSPI_SI01	Serial Data Input in Quad-SPI	I
12	QSPI_CS	Chip Select Signal in MIPI DBI Type-B(MPU) and Type-C(SPI) Active Low	I
13	GND	Ground	P
14	LCD_TE	Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command. When this pin is not activated, this pin is output low.	O
15	VDD3V3	Power Supply for Analog Circuits	P
16	VCI_EN	Power Supply enabled	P
17	VBAT	Power Supply for POWER IC	P
18	GND	Ground	P
19	TP_SCL_3.3V	CTP I2C CLK	I
20	TP_SDA_3.3V	CTP I2C Data	I
21	TP_RST_3.3V	CTP RESET	I
22	TP_INT_3.3V	CTP INT	I
23	TP_VDD_3.3V	TP Power Supply for Analog Circuits	P
24	TP_GND	Ground	P

4. AMOLED Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal	10000	--	--		(1)(2)
LCM Luminance		LV	White Mode	600	700	--	cd/m2	(5)
Color gamut		S(%)	vs. NTSC	--	99	--	%	(1)
Color Filter Chromaticity	White	W_X		-0.04	0.300	+0.04		(1)(4)
		W_Y			0.310			
	Red	R_X			0.671			
		R_Y			0.328			
	Green	G_X			0.224			
		G_Y			0.700			
	Blue	B_X			0.140			
		B_Y			0.043			
OLED Life Time				30000	--	--	Hrs	
Option View		ALL						

*The data comes from the AMOLED specification.

Measuring Condition

Measuring surrounding : dark room

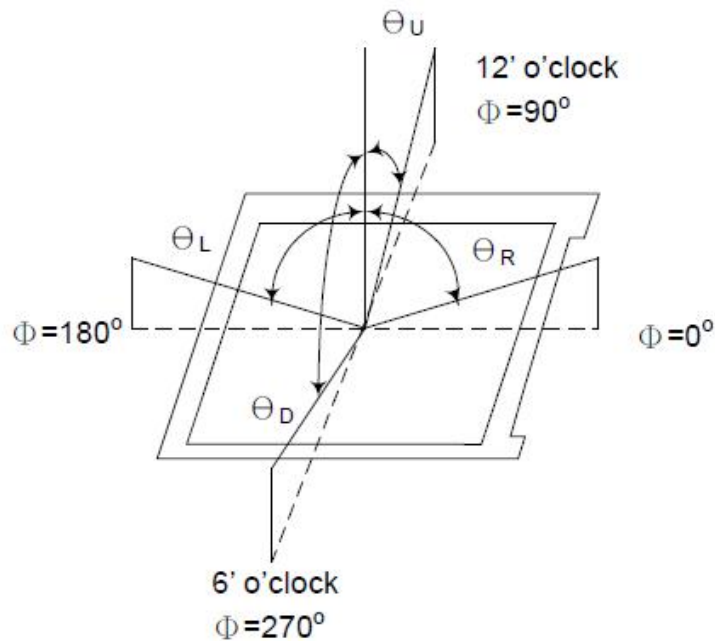
Ambient temperature : 25±2°C

15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

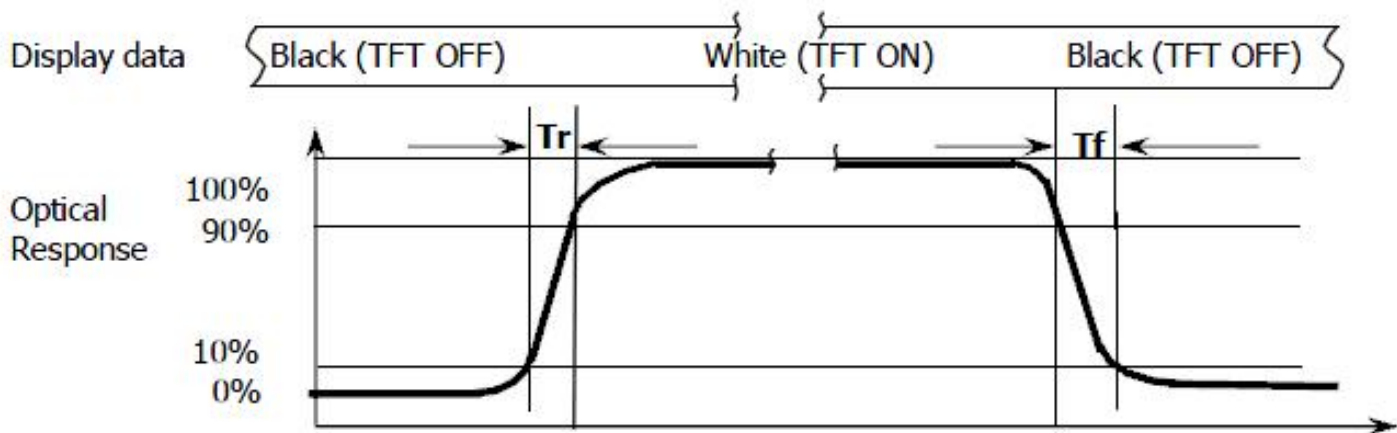
Note (1): Definition of Viewing Angle :



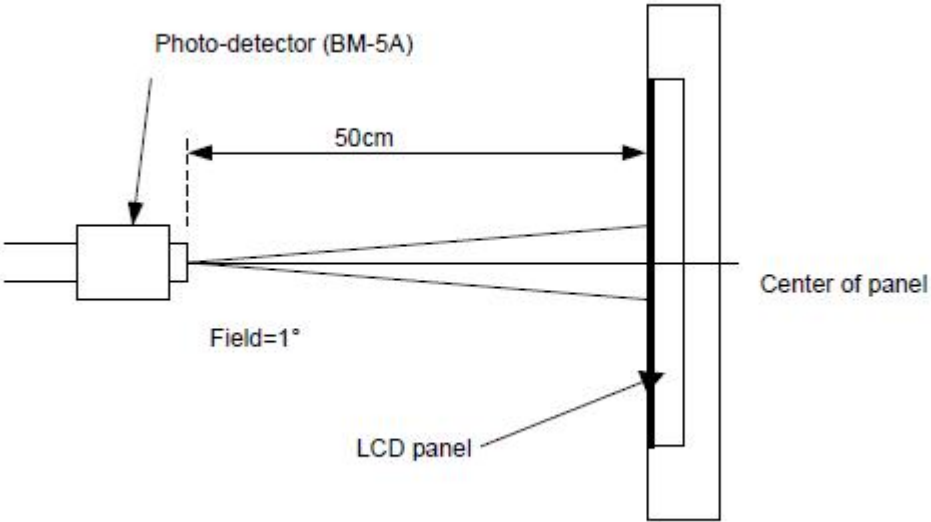
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

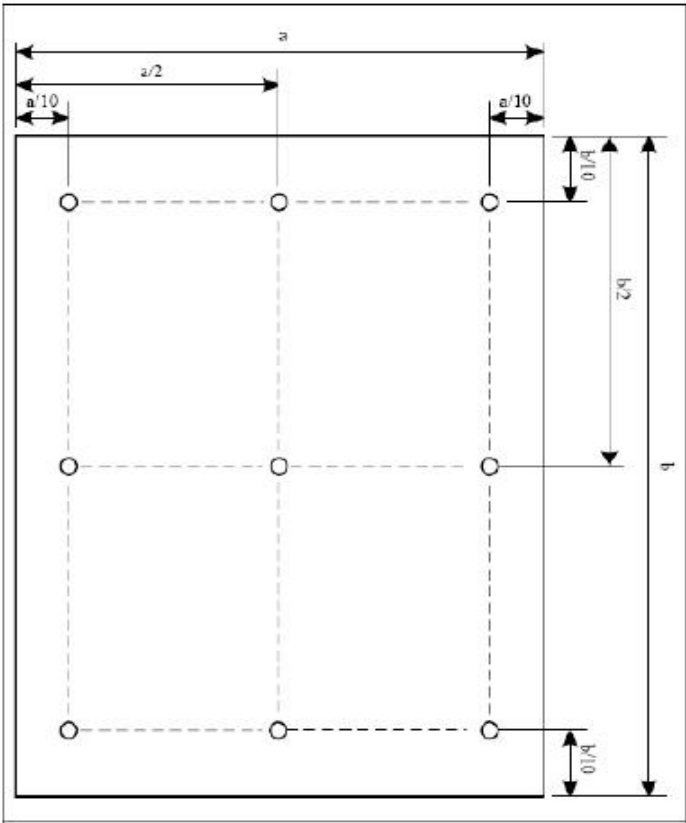
Note (3): Response Time



Note (4): Definition of optical measurement setup



NOTE (5): Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

5. AMOLED Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Analog Power supply	VDD	0	3.6	V
Power supply	VABT	0	5.0	
Operating temperature	T _{OP}	-10	+60	°C
Storage temperature	T _{ST}	-20	+70	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Power Supply	VDD	2.8	3.3	3.6	V	--
Current (display)	I _{VCC}	--	4.0	10	mA	(1)
Power IC Supply	VBAT	3.45	3.7	5	V	--
Current (VBAT)	I _{VBAT}	--	80	150	mA	(1)

Note1: Test conditions: VBAT=3.7V,VDD=3.3V,White screen, maximum brightness test

6. AC Characteristic

6.1 Write Cycle and Sequence

The QUAD SPI interface write command sequences are described in the following figure as below.

QSPI write protocol contain as below :

Instruction[7:0] = 02h

AD[23:0] = {8'h00, CMD[7:0], 8'h00}

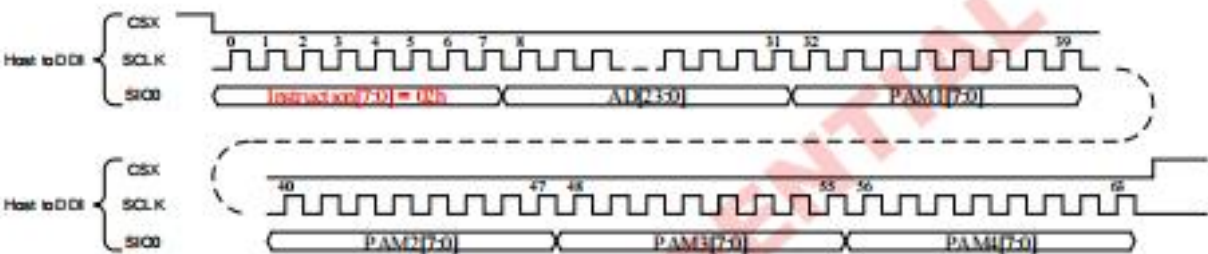
PAM[7:0]

Command write

Driver IC command address

Driver IC parameters

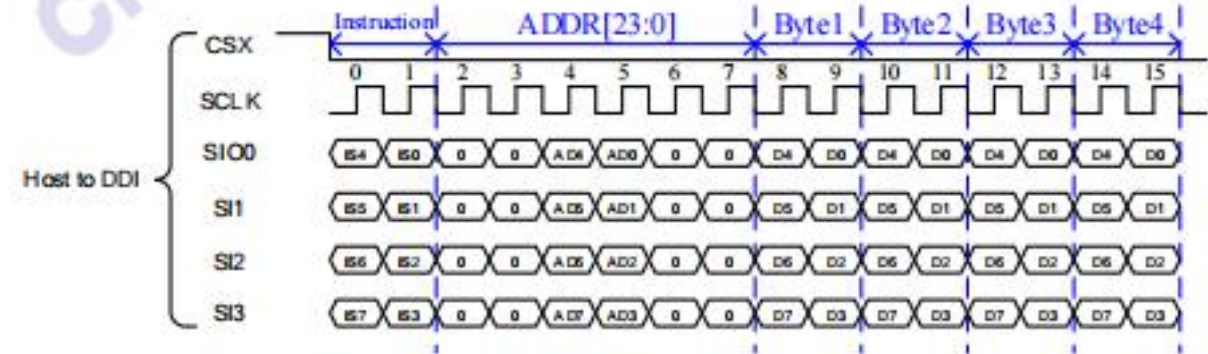
QSPI 1-wire write



QSPI 2-wire write



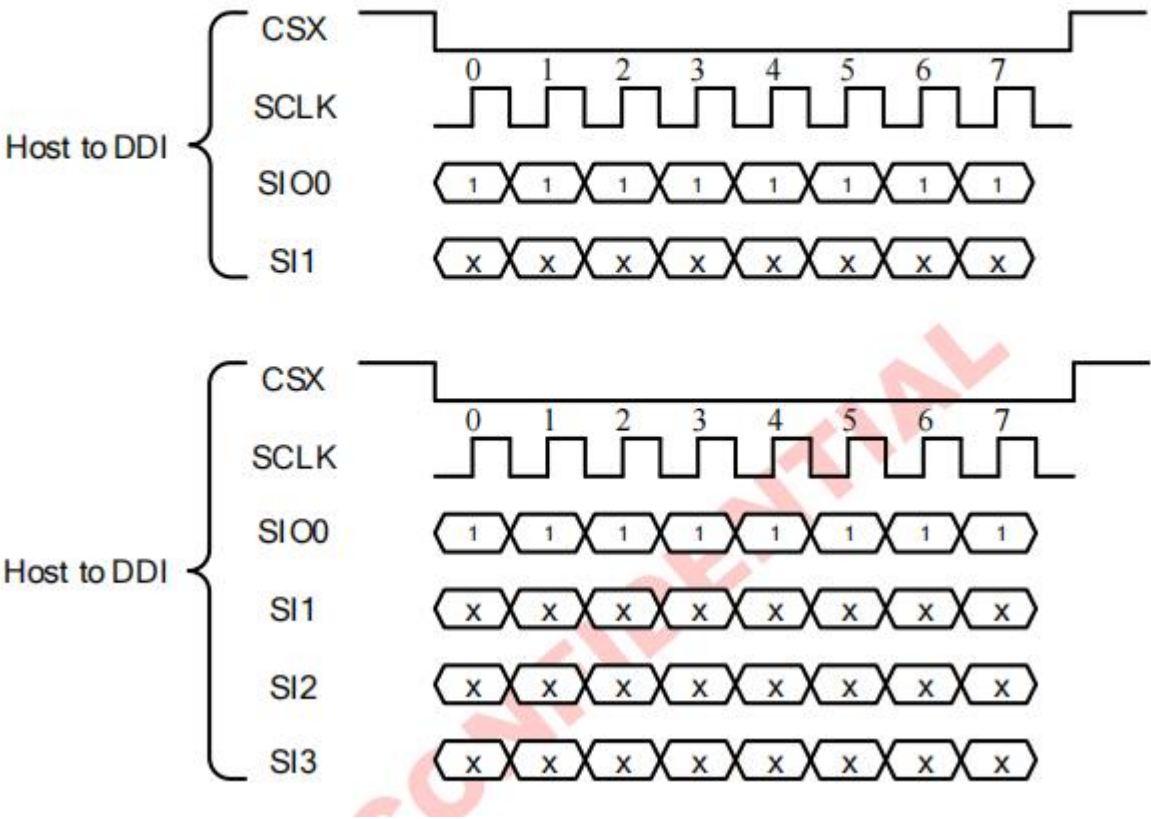
QSPI 4-wire write



6.2 Reset Function

2.Reset Function

If the host is operating in 1-wire SPI protocol and the driver IC is operating in 2-wire or 4-wire SPI protocol, then the DDIC interface is reset to 1-wire SPI.



7. Touch Specification

7.1 Electrical Characteristics

7.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
TP power supply Input	TP_VDD	0	3.6	V	
Operating temperature	T _{OP}	-10	+60	°C	
Storage temperature	T _{ST}	-20	+70	°C	

7.2 Touch Details

General Information Items	Specification	Unit	Note
	Main Panel		
Resolution	466(H)*466(V)	-	
Controller IC	ST8200	-	
Interface	I2C	-	
Slave Address	0x5A	-	
Touch mode	single point	-	-

7.3 Touch-driven website address

https://gitee.com/thomas0000/hyn_driver

hynitron driver 介绍

hyn_driver_release_qm 适用rk、高通、非TPD的MTK、展讯、全志等 平台的 linux、android系统

hyn_driver_release_mtk 适用带TPD的MTK 平台 支持DTS的linux、android系统

hyn_driver_for_JL hyn_driver_for_esp 适用单片机和RTOS

8. Quality Level

8.1 Standard

According to GB/T2828.1-2003/ISO 2859-1:1999 and ANSI/ASQC Z1.4-1993, General Inspection Level II and based on Major Defect: AQL 0.65, Minor Defect: AQL 1.5.

8.2 Definition

- 1) Major Defect: The defect that greatly affect the usability of product.
- 2) Minor Defect: The other defects, such as cosmetic defects, etc.
- 3) Definition of Inspection Zone 检验区的定义:

Zone A: Active Area

Zone B: Viewing Area except Zone A Zone

C: Outside Viewing Area

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble of quality and assembly to customer`s product.

8.3 Inspection Methods

1. General Inspection: under 20W x 2 or 40W fluorescent light(1000+200LUX), about 30cm viewing distance, within 45° viewing angle, under 25±5℃.

Inspection Pattern: Red/Green/Blue/White/Black/128 gray scale

2. The Brightness and Color Coordinate Inspection: By CS2000/09A-OLED-117 or the equal equipment, in the dark room, under 25±5℃.

9. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	60°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the OLED; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-10°C, 96HR	
High Temperature Storage	70°C, 96HR	
Low Temperature Storage	-20°C, 96HR	
High Temperature & High Humidity Storage	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-20°C,30 min ↔ 70°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±4KV, 5times; Contact:±4KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	

- Remark:
- 1.The test samples should be applied to only one test item.
 - 2.Sample size for each test item is 5~10pcs.
 - 3.For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
 - 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
 - 5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
 - 6. The color fading mura of polarizing filter should not care.

10. Cautions and Handling Precautions

10.1 Handling Precautions:

- (1)The display panel is made of glass and polarizer. As glass is fragile. It tends to become chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.
- (2) Do not apply excessive force to the display surface or the adjoining areas since this may cause abnormal. Do not touch the display with bare hands. This will stain the display area (some cosmetics are determined to the polarizer).
- (3) The polarizer covering the display surface of the OLED module is soft and easily scratched. Handle this polarizer carefully. Donot touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in to contact with room temperature air.
- (4) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents.
- Isopropyl alcohol
 - Ethyl alcohol
- Do not scrub hard to avoid damaging the display surface.
- (5) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
- Water
 - Ketone
 - Aromatic solvents
- Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil and fats.
- (6) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
- (7) When mounting the OLED module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable.
- (8) Do not attempt to disassemble or process the OLED module.
- (9) NC terminal should be open. Do not connect anything.
- (10) If the logic circuit power is off, do not apply the input signals.
- (11) To protect the display surface, the AMOLED Module is coated with a film. Be careful when peeling off this protective film, because static electricity may generate.

11. Packing

----TBD-----