SPECIFICATION
FOR
AMOLED Module

MODULE No:	ID-020HVOSN001
CUSTOMER:	

I DISPLAY	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

Date	Rev. No.	Page	Summary
2025.07.11	V1.0	ALL	FIRST ISSUE

Contents

1. Block Diagram 5
2. Outline dimension 6
3. Input terminal Pin Assignment 7
4. AMOLED Optical Characteristics 8
   4.1 Optical specification 8
5. AMOLED Electrical Characteristics 11
   5.1 Absolute Maximum Rating (Ta=25 VSS=0V) 11
   5.2 DC Electrical Characteristics 11
   5.3 Power Characteristic： 12
6. AC Characteristic 13
   6.1 Write Cycle and Sequence 13
   6.2 Reset Function 14
7. Quality Level 15
   7.1 Standard 15
8. Reliability Test Result 16
9. Cautions and Handling Precautions 17
   9.1 Handling Precautions: 17
10. Packing 18

* Description

This is a color active matrix AMOLED module using Low Temperature Poly-silicon Thin Film Transistors as a ctive switching devices. This module has a 2.06 inch diagonally measured active area with 410 horizontal b y 502 vertical pixel arrays. Each pixel is divided into RED and GREEN dots, or BLUE and GREEN dots, an d two pixels share RED or BLUE dots which are arranged in vertical stripe and this module can display 16.7 M colors.

* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	33.09*40.51 (2.06 inch)	mm	
Display colors	16.7M	colors	
Pixel pitch	80.7(H)*80.7(V)	um	
Number of pixels	410(RGB)*502	dots	
Viewing angle	ALL	o'clock	
Controller IC	CO5300	-	
LCM Interface	QSPI	-	
Display mode	AMOLED	-	
Operating temperature	-20～+60	℃	
Storage temperature	-30～+70	℃	

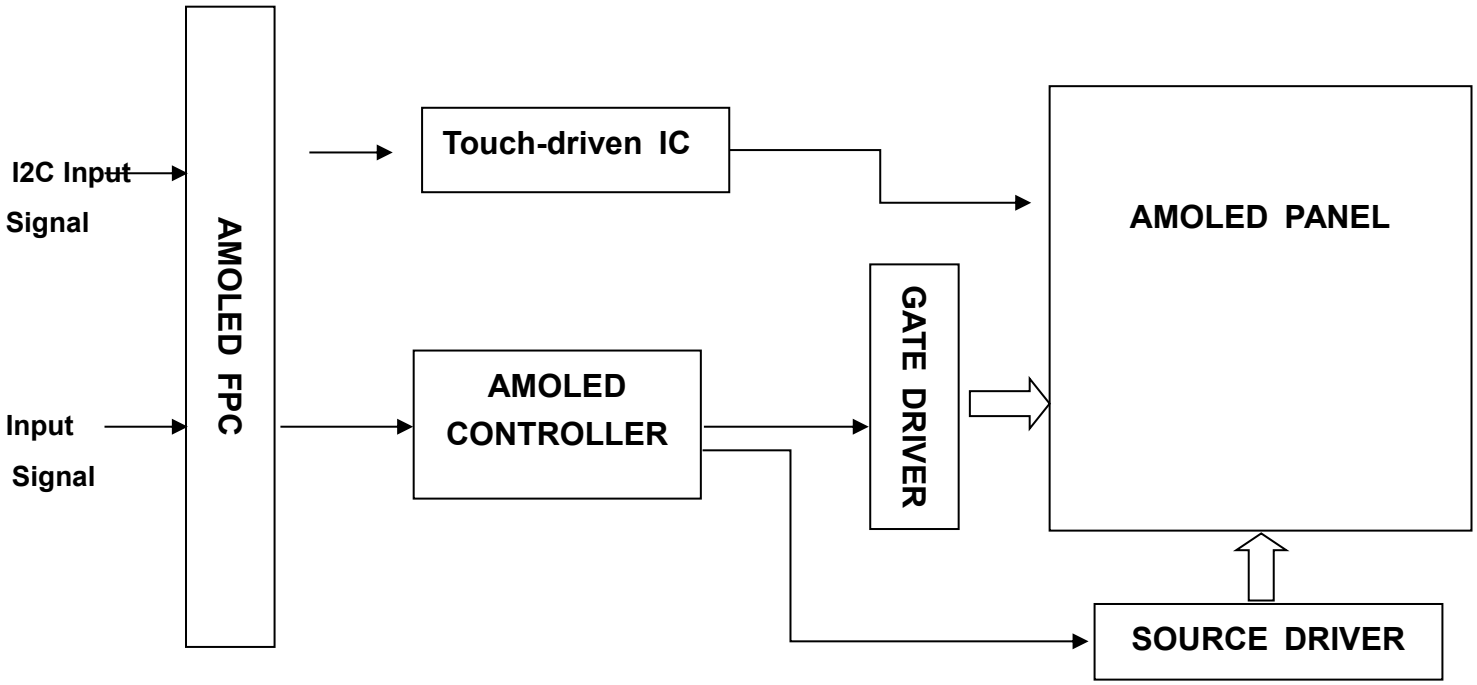
* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		34.79		mm	-
	Vertical(V)		43.14		mm	NOT2
	Depth(D)		0.78		mm	NOT1
Weight			3		g	-

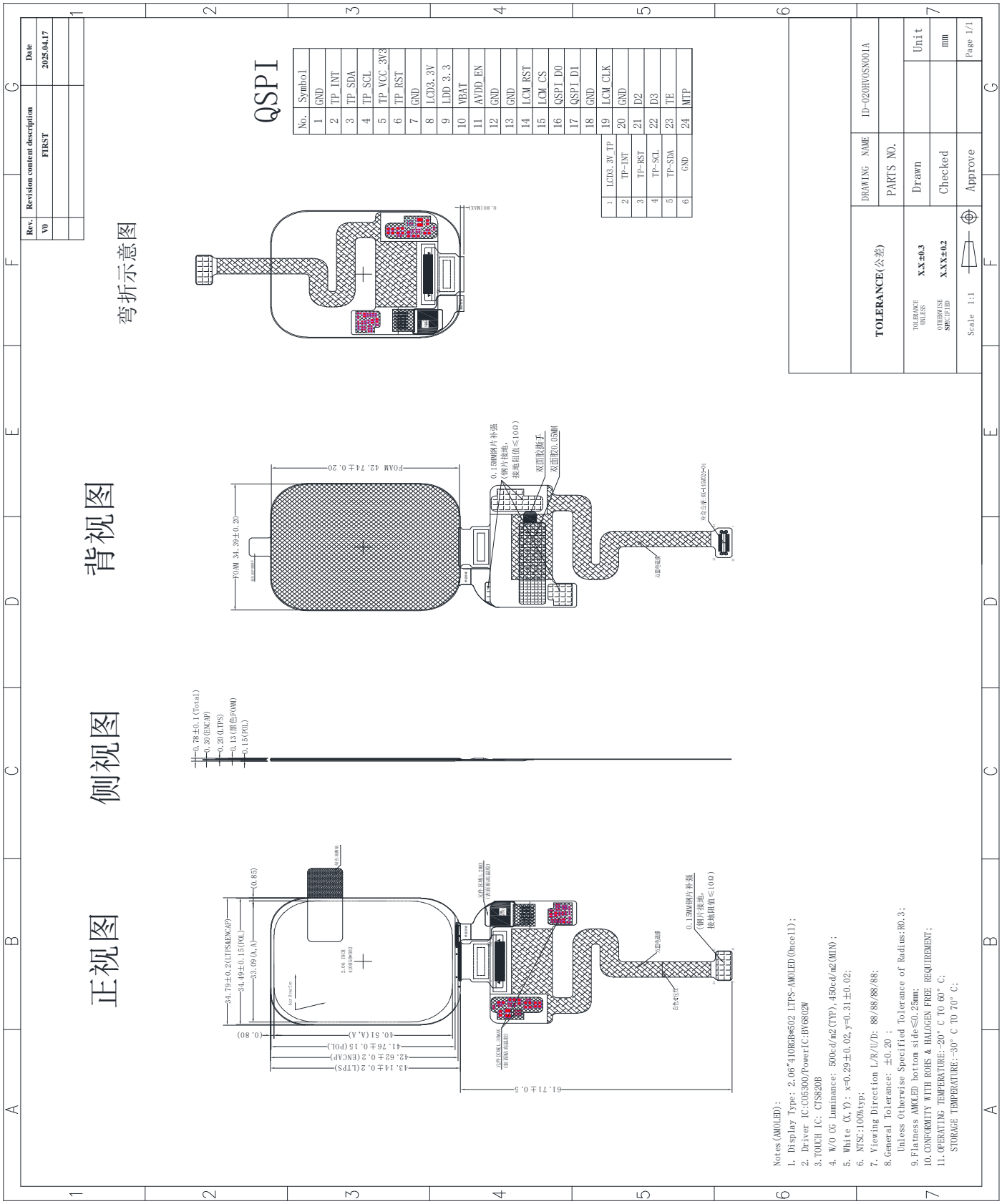
NOT1: Flat thickness without any bending

NOT2: Including the length of the FPC after bending

1. Block Diagram



2. Outline dimension



3. Input terminal Pin Assignment

Connector：OK-14GM024-04

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground	P
2	TP_INT	Touch Panel Interrupt	O
3	TP_SDA	Touch Panel Data	I
4	TP_SCL	Touch Panel ClocK	I
5	TP_VCC_3V3	Power Supply for touch IC	P
6	TP_RST	Touch Panel Reset	I
7	GND	Ground	P
8	LCD3.3V	Power Supply for Analog Circuits	P
9	LDD3.3V	Power Supply for Analog Circuits	P
10	VBAT	Power Supply for POWER IC	P
11	AVDD_EN	Enable for AVDD	I
12	GND	Ground	P
13	GND	Ground	P
14	LCD_RST	Device reset signal	I
15	LCD_CS	Chip Select Signal in MIPI DBI Type-B(MPU) and Type-C (SPI) Active Low	I
16	QSPI_D0	Serial Data Input in Quad-SPI	I
17	QSPI_D1	Serial Data Input in Quad-SPI	I
18	GND	Ground	P
19	LCM_CLK	Serial Clock Input in Quad-SPI	I
20	GND	Ground	P
21	QSPI_D2	Serial Clock Input in Quad-SPI	I
22	QSPI_D3	Serial Clock Input in Quad-SPI	I
23	TE	Tearing effect output pin to synchronize MCU to frame	-
24	MTP	External Voltage Input for OTP Data Program	-

4. AMOLED Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal	TBD	--	--		(1)(2)
LCM Luminance		LV	White Mode	--	500	--	cd/m2	
Color gamut		S(%)	vs. NTSC	90	100	--	%	(1)
Color Filter Chromacicity	White	W_X		-0.04	0.298	+0.04		(1)(4)
		W_Y			0.314			
	Red	R_X			0.673			
		R_Y			0.326			
	Green	G_X			0.230			
		G_Y			0.685			
	Blue	B_X			0.139			
		B_Y			0.045			
OLED Life Time				30000	--	--	Hrs	
Option View		ALL						

Measuring Condition

Measuring surrounding : dark room

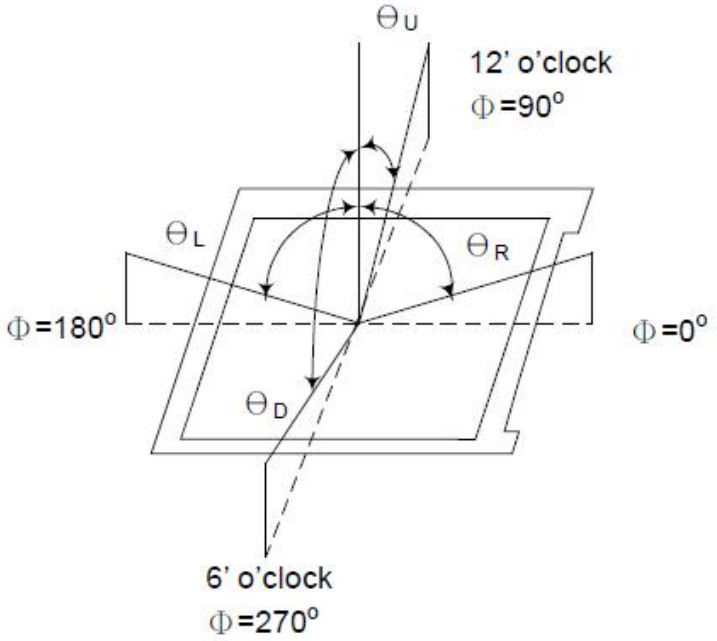
Ambient temperature : 25±2°C

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.

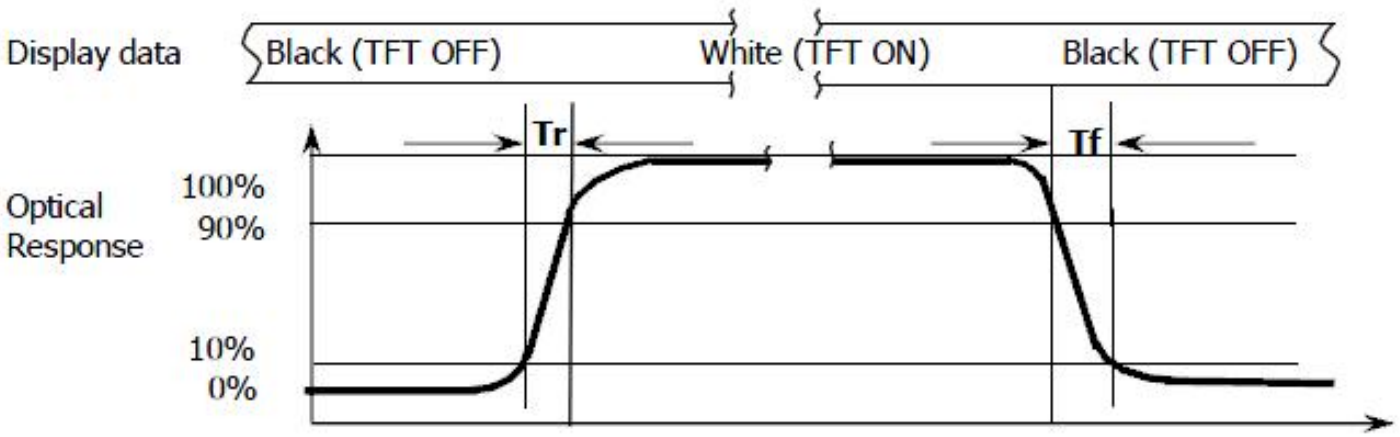
Note (1): Definition of Viewing Angle :



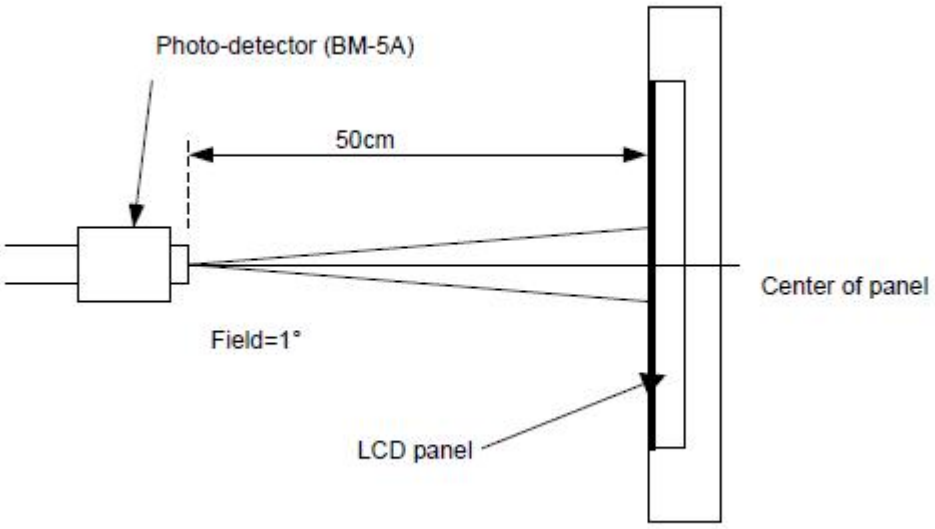
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

Note (3): Response Time



Note (4): Definition of optical measurement setup



5. AMOLED Electrical Characteristics

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

Characteristics	Symbol	Min.	Max.	Unit
Analog Power supply	VDD	-0.3	3.6	V
Power IC Supply	VBAT	0	5.0	V
Operating temperature	T_{OP}	-20	+60	℃
Storage temperature	T_{ST}	-30	+70	℃

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	2.7	3.3	3.6	V	--
Power IC Supply	VBAT	2.9	3.7	5	V	

5.3 Power Characteristic：

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
AMOLED Power positive	ELVDD	-	3.3 @Normal/AOD	3.5 @HBM	V	Ref
AMOLED Power negative	ELVSS	-3.5 @HBM	-3.3 @Normal/AOD	-	V	Ref
Digital Power supply	VDDIO	-	1.8	-	V	Ref
Analog Power supply	VCI	-	3.3	-	V	Ref

6. AC Characteristic

6.1 Write Cycle and Sequence

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

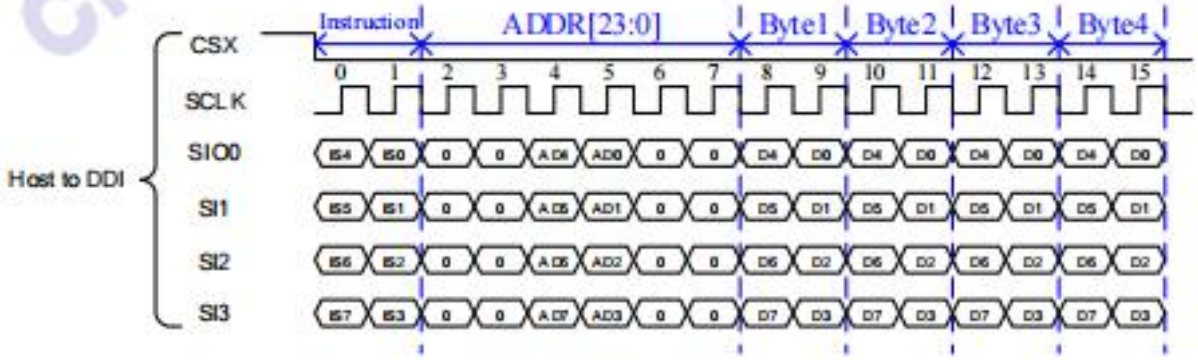
QSPI write protocol contain as below :

Instruction[7:0] = 02h	Command write
AD[23:0] = {8'h00, CMD[7:0], 8'h00}	Driver IC command address
PAM[7:0]	Driver IC parameters

QSPI 1-wire write

QSPI 2-wire write

QSPI 4-wire write

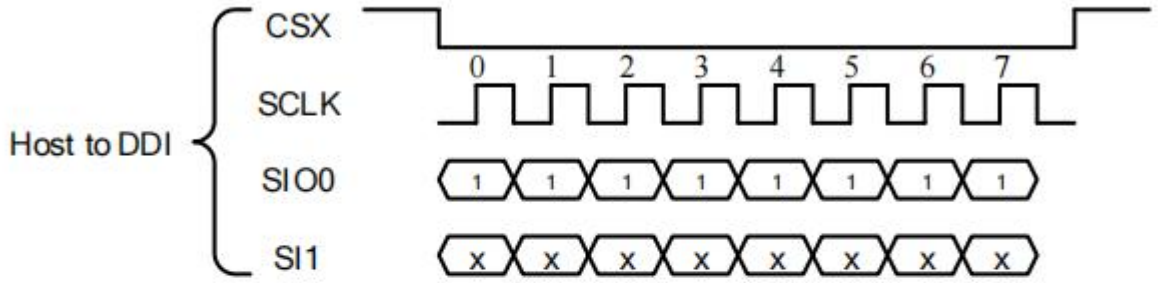


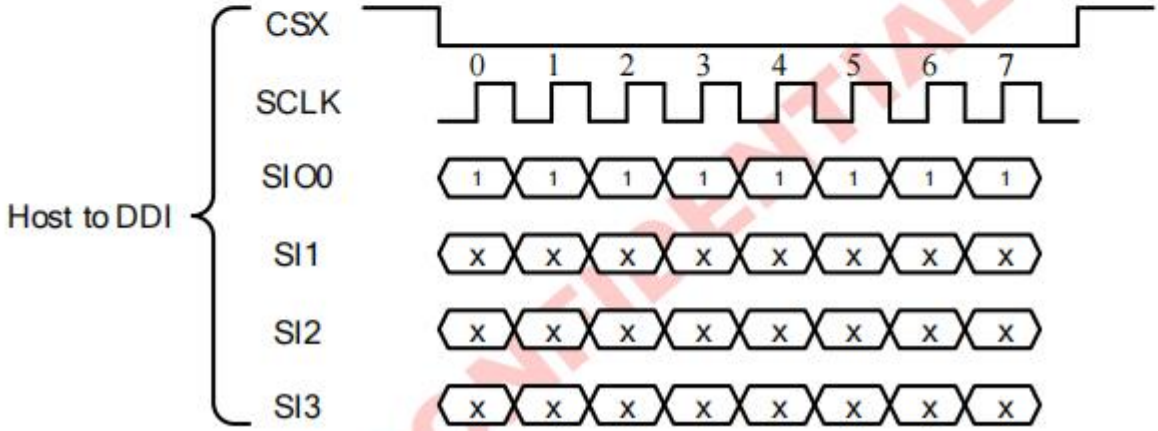
CHIPONE CONFIDENTIAL

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.





CONFIDENTIAL

7. Quality Level

7.1 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.

7.2 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.

7.3 Inspection Methods

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

8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	60℃,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	-20℃, 96HR	
High Temperature Storage	70℃, 96HR	
Low Temperature Storage	-30℃, 96HR	
High Temperature & High Humidity Storage	+60℃, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-20℃,30 min ↔ 70℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±4KV, 5times; Contact:±4KV, 5 times; (Environment: 15℃~35℃, 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.

9. Cautions and Handling Precautions

9.1 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.

10. Packing

----TBD----------