

SPECIFICATION FOR AMOLED Module

MODULE No:	ID-010LQOSN001-C0000
CUSTOMER:	

I DISPLAY	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

[illegible]

Part. No	ID-010LQOSN001-C0000	REV	V1.3	Page 2 of 18
----------	----------------------	-----	------	--------------

Contents

1. Block Diagram	5
2. Outline dimension	6
3. Input terminal Pin Assignment	7
3.1 CTP PIN Define	8
4. AMOLED Optical Characteristics	9
4.1 Optical specification	9
5. AMOLED Electrical Characteristics	12
5.1 Absolute Maximum Rating (Ta=25 VSS=0V)	12
5.2 DC Electrical Characteristics	12
6. AC Characteristic	14
7. Quality Level	15
7.1 Standard	15
7.2 Definition	15
7.2 Inspection Methods	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 active switching devices. This module has a 1.04 inch diagonally measured active area with 340 horizontal by 340 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 16.7 M colors.

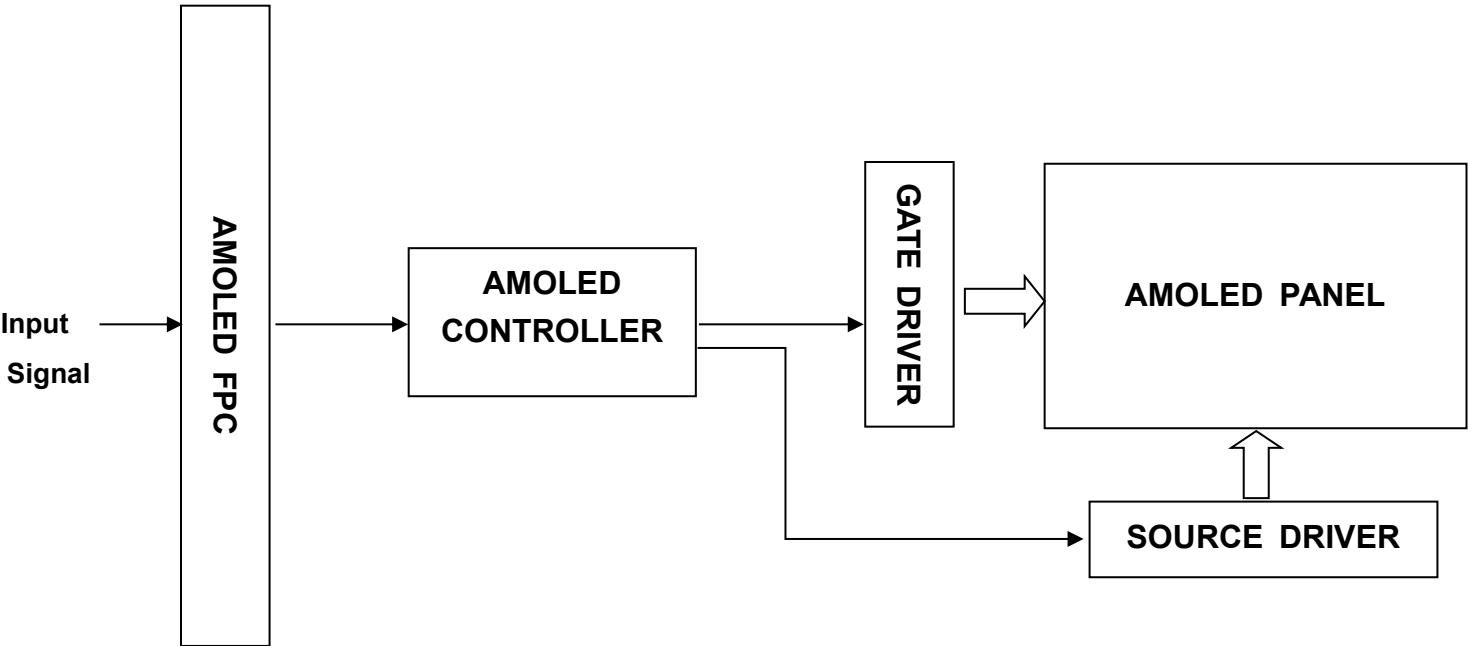
* **Features**

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	Φ26.35 (1.04 inch)	mm	
Display colors	16.7M	colors	
Pixel pitch	0.0775(H)*0.0775(V)	mm	
Number of pixels	340(RGB)*340	dots	
Viewing angle	ALL	o'clock	
Controller IC	CO5300	-	
Touch Controller IC	CST9217(Oncell)	-	
LCM Interface	QSPI	-	
Display mode	AMOLED	-	
Operating temperature	-10~+60	℃	
Storage temperature	-20~+70	℃	

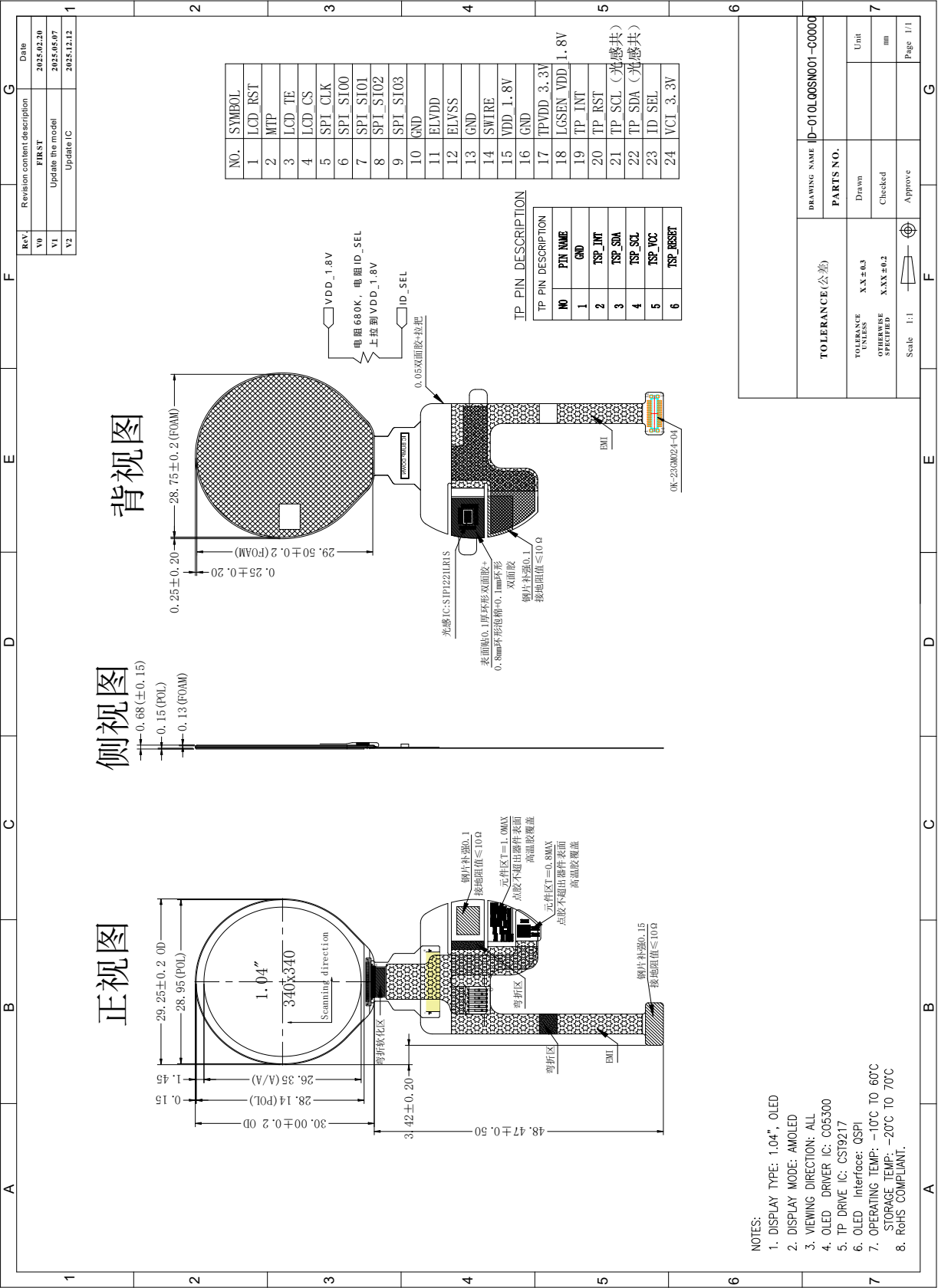
* **Mechanical Information**

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		29.25		mm	-
	Vertical(V)		30		mm	-
	Depth(D)		0.68		mm	-
Weight			1		g	-

1. Block Diagram



2. Outline dimension



Part. No	ID-010LQOSN001-C0000	REV	V1.3	Page 6 of 18
----------	----------------------	-----	------	--------------

3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	LCD_RST	Device reset signal (0 : Enable ; 1: Disable)	I
2	MTP	External Voltage Input for OTP Data Program	I
3	LCD_TE	Tearing effect output pin to synchronize MCU to frame	O
4	LCD_CS	Chip Select Signal in MIPI DBI Type-B(MPU) and Type-C (SPI) Active Low	I
5	SPI_CLK	Serial Clock Input in Quad-SPI	I
6	SPI_SI00	Serial Data Input in Quad-SPI	I
7	SPI_SI01		I
8	SPI_SI02		I
9	SPI_SI03		I
10	GND	Ground	P
11	ELVDD	AMOLED Positive Power Supply	P
12	ELVSS	AMOLED Negative Power Supply	P
13	GND	Ground	P
14	SWIRE	SWIRE signal for PWR IC control	O
15	VDD_1.8V	Power Supply for Analog Circuits	P
16	GND	Ground	P
17	TPVDD_3.3V	Touch Panel Power	P
18	LGSEN_VDD_1.8V	Light Sensation Power	P
19	TP_INT	Touch Panel Interrupt	O
20	TP_RST	Touch Panel Reset	I
21	TP_SCL	Touch Panel Clock	I
22	TP_SDA	Touch Panel Data	I
23	ID_SEL	NC	-
24	VCI_3.3V	Power Supply for Analog Circuits	P

3.1 CTP PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground	P
2	TSP_INT	Touch Panel Interrupt	O
3	TSP_SDA	Touch Panel Data	I
4	TSP_SCL	Touch Panel Clock	I
5	TSP_VCC	Touch Panel Power	P
6	TSP_RESET	Touch Panel Reset	I

4. AMOLED Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal	100000	--	--		(1)(2)
LCM Luminance		LV	White Mode	560	630	690	cd/m2	
Color gamut		S(%)	vs. NTSC	90	100	--	%	(1)
Color Filter Chromaticity	White	W _X		-0.04	0.3013	+0.04		(1)(4)
		W _Y			0.325			
	Red	R _X			0.678			
		R _Y			0.322			
	Green	G _X			0.258			
		G _Y			0.666			
	Blue	B _X			0.138			
		B _Y			0.057			
OLED Life Time				30000	--	--	Hrs	
Option View		ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

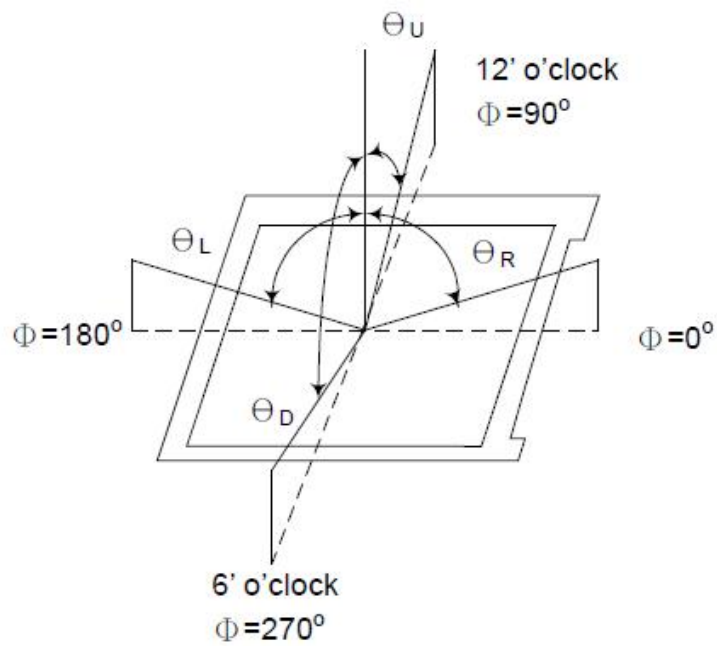
Ambient temperature : 25±2°C

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.

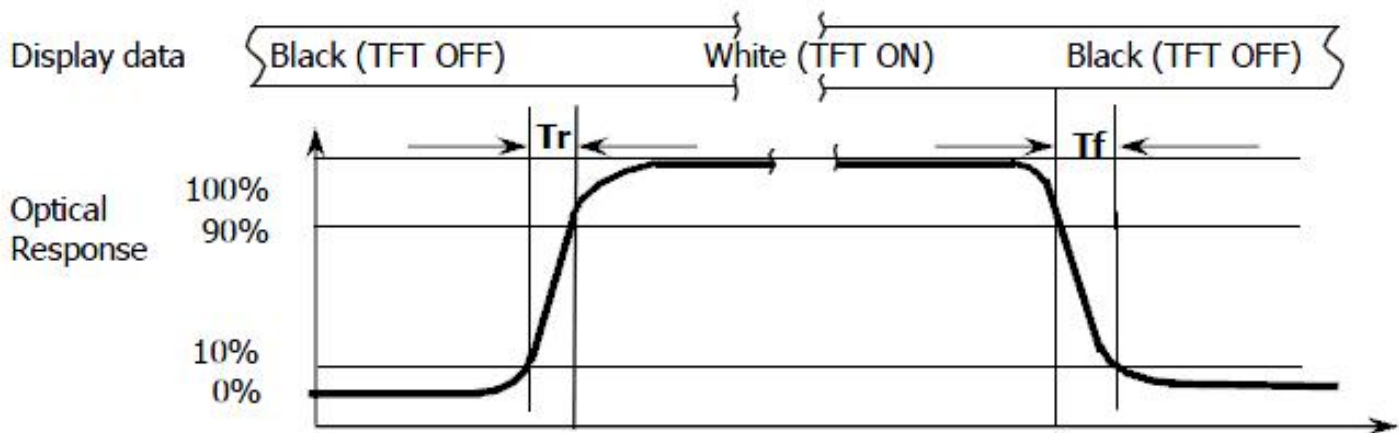
Note (1): Definition of Viewing Angle :



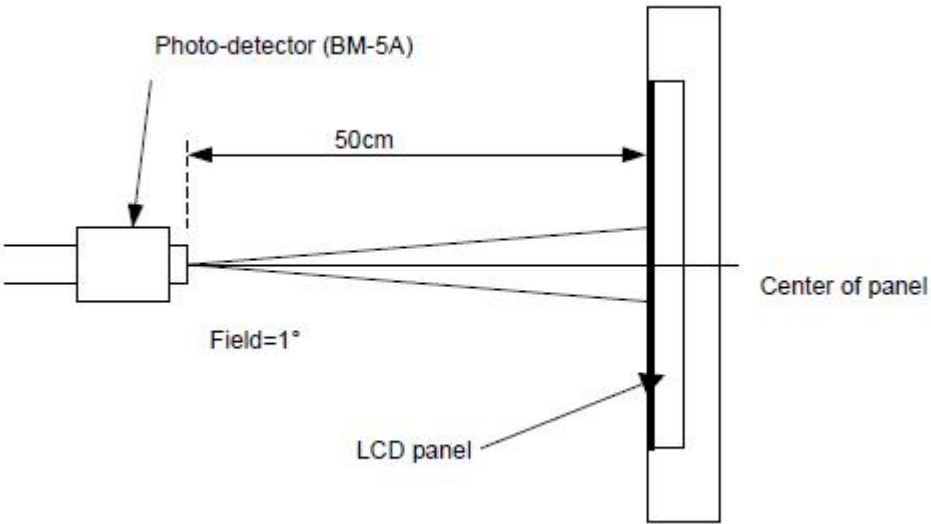
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

Note (3): Response Time



Note (4): Definition of optical measurement setup



5. AMOLED Electrical Characteristics

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

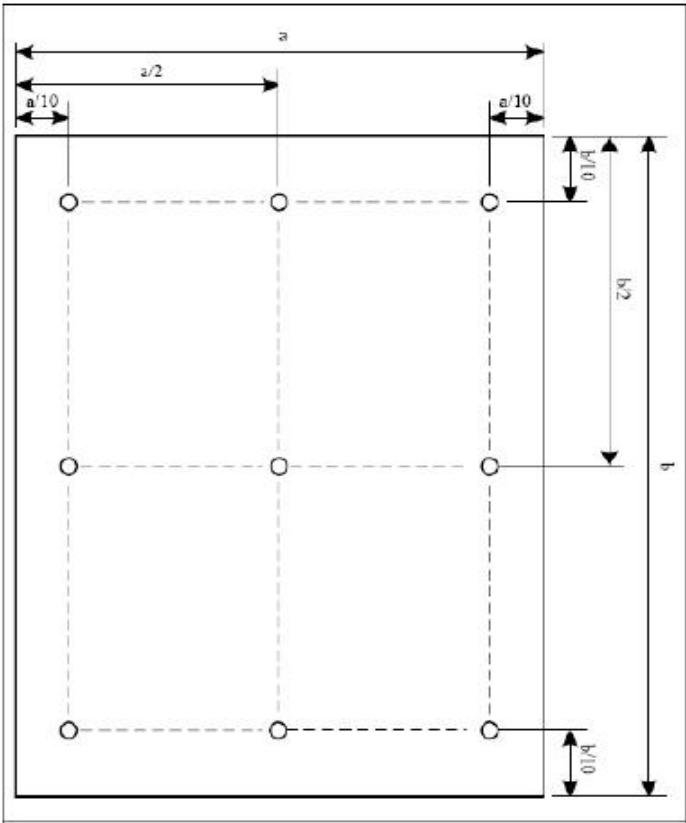
Characteristics	Symbol	Min.	Max.	Unit
Analog Power supply	VDD	-0.3	3.6	V
Logic Power supply	IOVCC	-0.3	3.6	V
Positive Power Input	ELVDD	4.55	5.65	V
Negative Power Input	ELVSS	-2.45	-2.35	V
Operating temperature	T _{OP}	-10	+60	°C
Storage temperature	T _{ST}	-20	+70	°C

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
Logic Power Supply	IOVCC	2.7	2.8	3.6	V	--
Analog Power Supply	VCI	1,65	1.8	3.3	V	--
Positive Output Voltage	ELVDD	4.55	4.6	4.65	V	--
Negative Output Voltage	ELVSS	-2.45	-2.4	-2,35	V	--

NOTE 3: Luminance Uniformity of these 9 points is defined as below:



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

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

6. AC Characteristic

QSPI write protocol

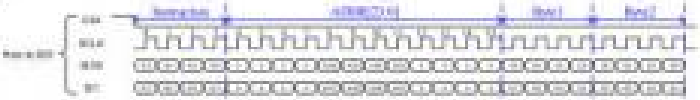
➤ QSPI Command/pixel write:支持888/666/565/332/111/GRAY256 data format

1 wire write

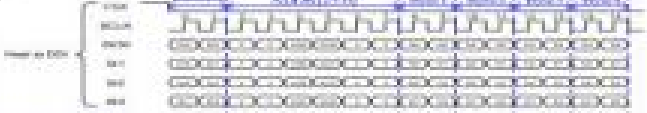


666/565/332格式支持补位方式:
补MSB/补0/补1

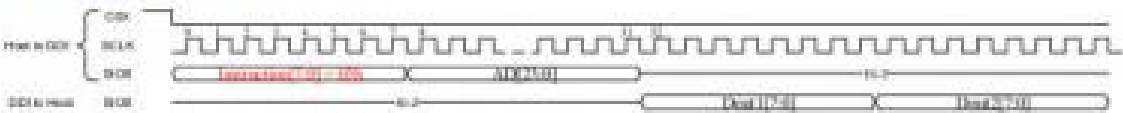
2 wire write



4 wire write

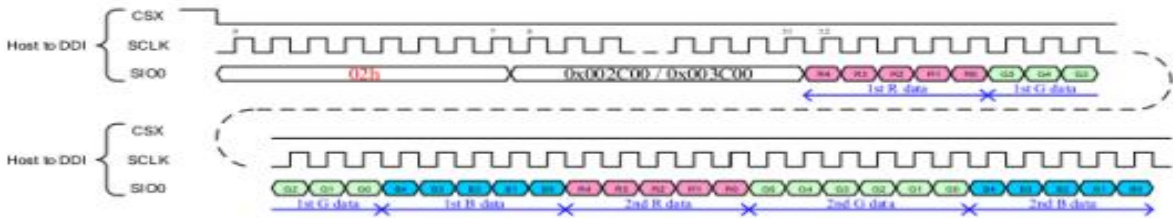


➤ QSPI Command/pixel read

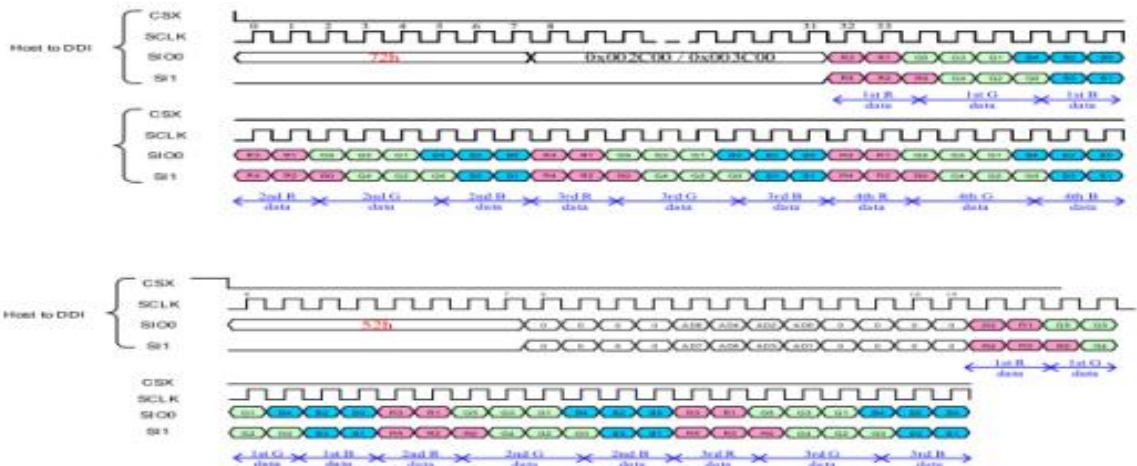


QSPI Data format for RGB565

1 wire



2 wire



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 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℃.

8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	60°C,96H	IEC60068-2-2,GB2423.2
Low Temperature Operating	-10°C, 96HR	IEC60068-2-1 GB2423.1
High Temperature Storage	70°C, 96HR	IEC60068-2-2 GB2423.2
Low Temperature Storage	-20°C, 96HR	IEC60068-2-1 GB2423.1
High Temperature & High	+60°C, 90% RH ,96 hours.	IEC60068-2-78 GB/T2423.3
Thermal Shock (Non-operation)	-20°C,30 min ↔ 70°C,30 min, Change time:5min 20CYC.	Start with cold temperature, End with high temperature, IEC60068-2-14,GB2423.22

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. Do not 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-----