

5.99" FHD Product Specification Rev. P0

Customer Name : _____

Product Name : 5.99" FHD1080 AMOLED

Model Name : BO599FF2KM

Description : 5.99" FHD (1080x2160) 16M Color

Proposed by			Customer's Approval
Designed	Checked	Approved	

Chengdu BOE Optoelectronics Technology CO., LTD

Revision History

Rev.	ECN No.	Description of Change	Date	Prepared
P0	-	-.Initial issue	2017.07.12	

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1. General Description

1-1. Introduction

BOE 5.99" FHD is a color active matrix AMOLED module using Low Temperature Poly-silicon TFT's (Thin Film Transistors) as active switching devices. This module has a 5.99inch diagonally measured active area with FHD resolutions (1080horizontal by 2160vertical 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 16.7M colors.

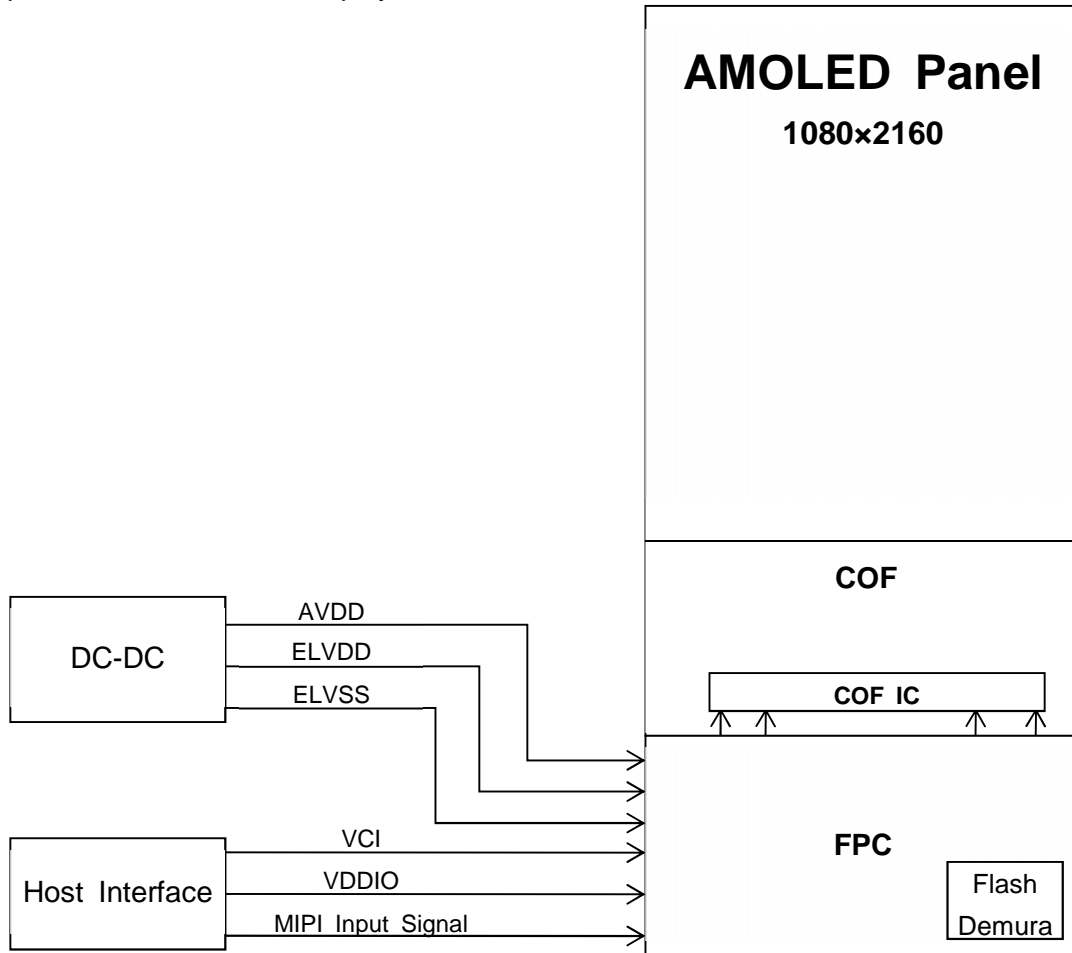


Figure 1

1-2. Features

- 1) AMOLED Display type with 3D Cover Glass
- 2) Display Format : 5.99" FHD GGRB : 1080x2160
- 3) Interface : MIPI-DSI 4 lanes
- 4) Driver IC : SW43404
- 5) Polarizer : CPOL(with PSA)+Flexible Touch Sensor

1-3. Application

- Smart Mobile Phone

2. Specification

2-1. Panel Specification

Table 1

Item	Specifications	Unit	Remark
Panel outline	70.04×139.53×0.13	mm	
Number of dots	1080×2160		18:9
Active area	68.04×136.08	mm	
Diagonal Inch	5.99	inch	
Pixel pitch	63	um	
Pixel Arrangement	GGRB		

2-2. Mechanical Specification

Table 2

Item	Specifications	Unit	Remark
MDL outline	71.35×150.42	mm	
View area	68.63×137.08	mm	
Weight	TBD		
Total Thickness	1.416	mm	

3. Absolute Maximum Ratings

Table 3

Item	Symbol	Min.	Max.	Unit	Note
I/O Voltage	VDDIO	1.62	1.98	V	
Operation Voltage	VCI	2.60	3.60	V	
EL Driving Voltage	ELVDD	4.40	4.80	V	
	ELVSS	-5.00	-1.40	V	
Supply voltage (TSP)	VCC	2.7	3.6	V	
Operating temperature	Topr	-20	70	°C	
Storage temperature	Tstg	-40	80	°C	

4. Electrical Characteristics

4-1 Power Consumption of Display Panel and Touch panel

Test Condition: Temp=25±2°C

Table 4

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
ELVDD	ELVDD	-	4.40	4.60	4.80	V		
ELVSS	ELVSS	-	-5.0	-2.40	-1.40	V	Controlled by DDIC	
AVDD	AVDD	-	5.40	6.80	7.70	V		
VCI	VCI	-	2.60	3.00	3.60	V		
VDDIO	VDDIO	-	1.62	1.80	1.98	V		
Current Consumption (Display)	Display on mode	IC	VCI	1.5	2.0	2.5	mA	Full White 390 nit
			VDDIO	20.0	30.0	40.0	mA	
		Panel	EL	10	20	30	mA	
	Sleep in mode	IC	VCI	180	220	260	mA	
			VDDIO	-	0.1	0.3	mA	
				1.0	1.5	2.0	mA	
Frame Frequency	F _{frm}	-	59	60	61	Hz		
Vin	Vin(DC DC Input)	White Mode L255	-	-	-	mA	Vin=4v	
			-	-	-	mA	Vin=3.7v	

Notes :

1. The value is just the reference value. The customer may optimize the setting value.
2. The current of Vin is just the reference value, because it depends on the efficiency of Power IC.

4-2 Power Consumption of Display Panel and Touch panel

Power Supply: TSP_3.3V =3.3V, TSP_1.8V =1.8V, VCI_3.0V =3.0V, VDD_1.8V =1.8V, VLIN1=6.8V

Report Rate: 80Hz @ Display panel Frame Frequency = 60Hz

Table 5

Work Mode	Item	Symbol	Value		Unit	Remark
			Typ	Max		
Sleep Mode	Current of TSP_1.8V	ITSP_1.8V	10	-	uA	
	Current of TSP_3.3V	ITSP_3.3V	50	-	uA	
Idle Mode	Current of TSP_1.8V	ITSP_1.8V	500	-	uA	
	Current of TSP_3.3V	ITSP_3.3V	10	-	mA	
No finger	Current of TSP_1.8V	ITSP_1.8V	1.95	-	mA	
	Current of TSP_3.3V	ITSP_3.3V	20	-	mA	
1 Finger	Current of TSP_1.8V	ITSP_1.8V	7.65	-	mA	
	Current of TSP_3.3V	ITSP_3.3V	22	-	mA	
5 Finger	Current of TSP_1.8V	ITSP_1.8V	10.05	-	mA	
	Current of TSP_3.3V	ITSP_3.3V	23	-	mA	
10 Finger	Current of TSP_1.8V	ITSP_1.8V	11.85	-	mA	
	Current of TSP_3.3V	ITSP_3.3V	25	-	mA	

5. Electro-optical Characteristics

Table 6

Item	Symbol	Temp	Condition	Min.	Typ.	Max.	Unit	Note
Brightness		25°C	Normal (W L255)	351	390	429	Cd/m ²	Center Brightness
Uniformity		25°C		75	85	-	%	(1)
Contrast ratio	K	25°C	$\Phi=0^\circ, \theta=0^\circ$	-	100000:1	-	-	(2) Based on CA-310 (Probe 10 Φ)
Color of CIE coordinate	White	x	$\Phi=0^\circ, \theta=0^\circ$ CIE1931	0.2686	0.2988	0.3305	-	Color of CIE coordinate
		y		0.2978	0.3158	0.3347	-	
	Red	x		0.635	0.665	0.695	-	
		y		0.304	0.334	0.364	-	
	Green	x		0.207	0.237	0.267	-	
		y		0.681	0.711	0.741	-	
	Blue	x		0.115	0.135	0.155	-	
		y		0.032	0.0520	0.072	-	
Color Gamut		25°C	NTSC , CIE1931	86	101	116	%	(3)
White color shift		25°C	$\Phi=30^\circ, \theta=30^\circ$	-	≤ 5.2	-	JNCD	
Viewing Angle		25°C	Up/Down/Right/Left CR ratio ≥ 10	75	80	-	deg	(4)
Cross Talk		25°C	Background: gray128	-	-	2%		(5)
Gamma		25°C	-	2.0	2.2	2.4		
Life time		25°C	Light on for 240 hrs.	luminance decrease $\leq 6\%$			cd/m ²	(6)

Notes :

(1) Uniformity Measuring Point: Typical luminance: based on different customers different requirements, for example 350 cd/m², 380 cd/m², 390 cd/m² etc.

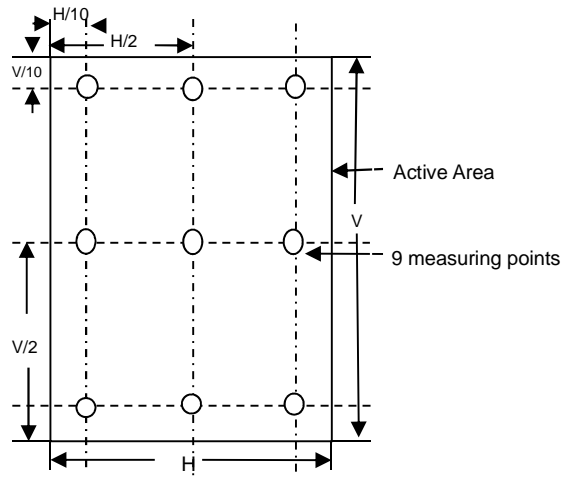


Figure 2. Uniformity Measuring Point

$$\text{Uniformity} = \frac{L_{\min}}{L_{\max}} \times 100\%$$

(2) Definition of contrast ratio(K)

$$CR = \frac{\text{Luminance When Display panel is at "White" state}}{\text{Luminance When Display panel is at "Black" state}}$$

(3) Definition of Color of CIE Coordinate and NTSC Ratio

The test condition is at 25°C and measured on the surface of Display panel module.

- Measurement equipment: CS2000 or similar equipment.
- The Color Coordinate (CIE 1931/CIE 1976) measure the center of active area of the module.

$$S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$$

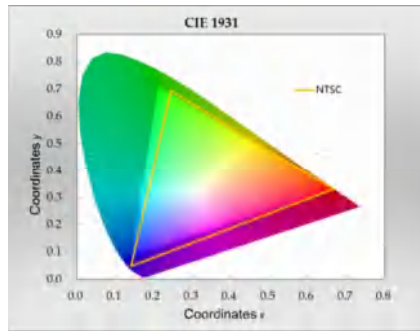


Figure 4. Color Coordinate

(4) Viewing Angle measuring system

Refer to the graph below marked by θ and Φ

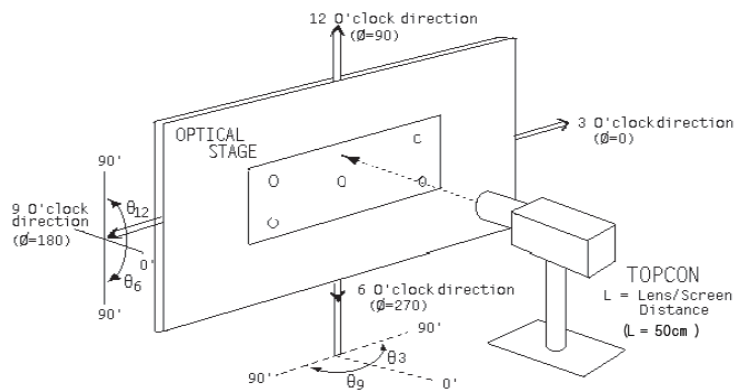


Figure 5. Viewing Angle measuring system

(5) Crosstalk measurement shall be done at the center of the different pattern and the result shall be calculated as follow formula.

- measure luminance at the center.
- calculate cross talk as below equation:

$$\text{Crosstalk}(V = \max \text{ ————— } 100, \text{ ————— } 100$$

$$\text{Crosstalk}(H = \max \text{ ————— } 100, \text{ ————— } 100$$

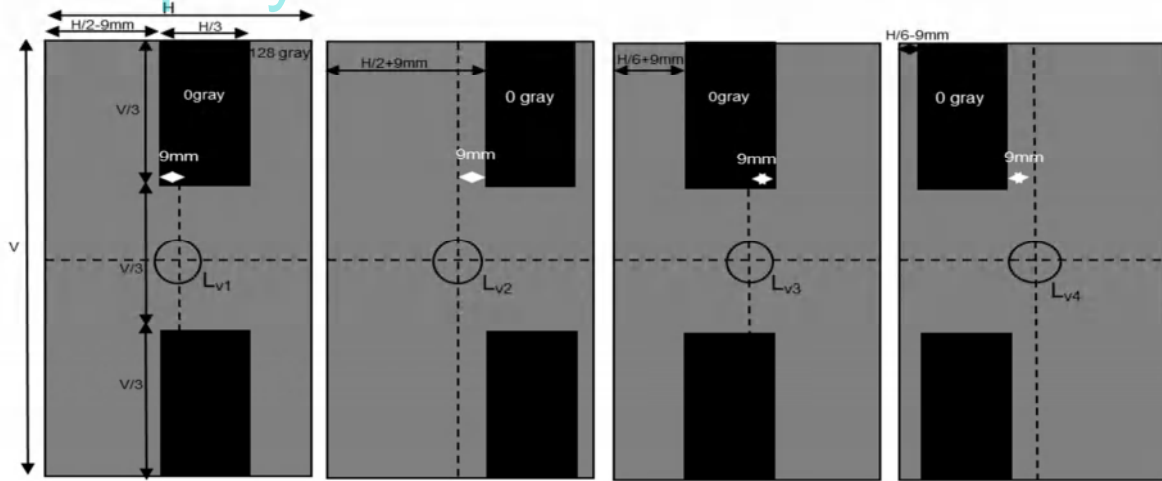


Figure 6. Vertical crosstalk measuring pattern

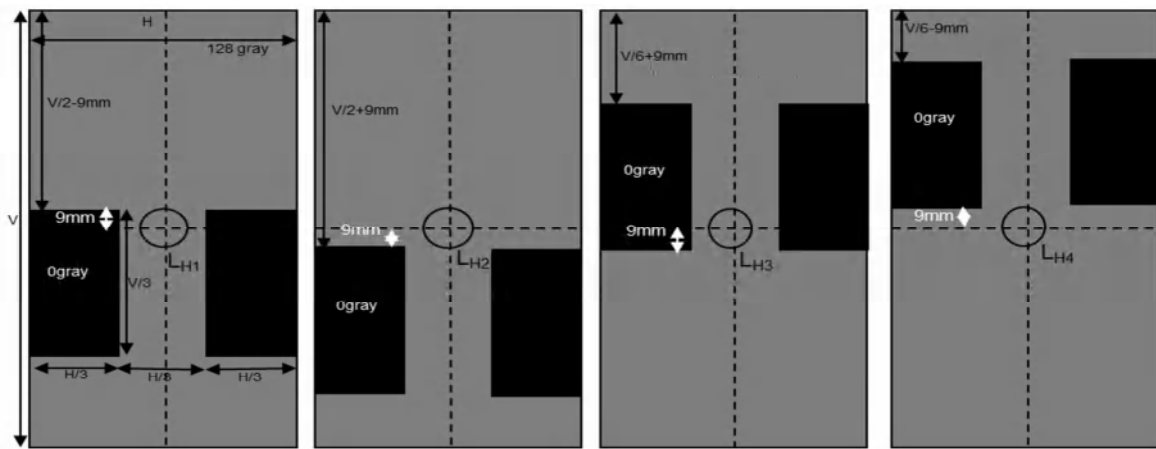


Figure 7. Horizontal crosstalk measuring pattern

(6) OLED life time

Test samples 8pcs;

At room temperature(25°C), light the module with typical value brightness, display a white pattern.

Keep working 240 hours, luminance decrease ≤6%.

The test data must pass the specification.