

Product Specification

❖ **Product Name: AMOLED**

❖ **Model Name: DO0200FS01**

❖ **Description: 2.0 inch (240x536)**

Proposed by			Customer's Approval
Designed	Checked	Approved	

Document Revision History

Rev. No.	Date	Contents	Remark
0.0	2022-08-11	-.Initial issue	Preliminary
0.1	2022-11-23	-.Add the description of i8080-8bit	
		-.Add the description of QSPI	

1.General Description:

- Driving Mode: Active Matrix.
- Color Mode: 16.7M/262K/65K color
- Display Format: 2.0" (240RGB x 536)
- Pixel arrangement: Real RGB arrangement
- Display Driver IC : RM67162
- Interface: SPI-3Wire/SPI-4Wire/ i8080-8Bit/QSPI
- Application: Handheld & PDA & Wearable
- RoHS Compatible

2.Mechanical Data

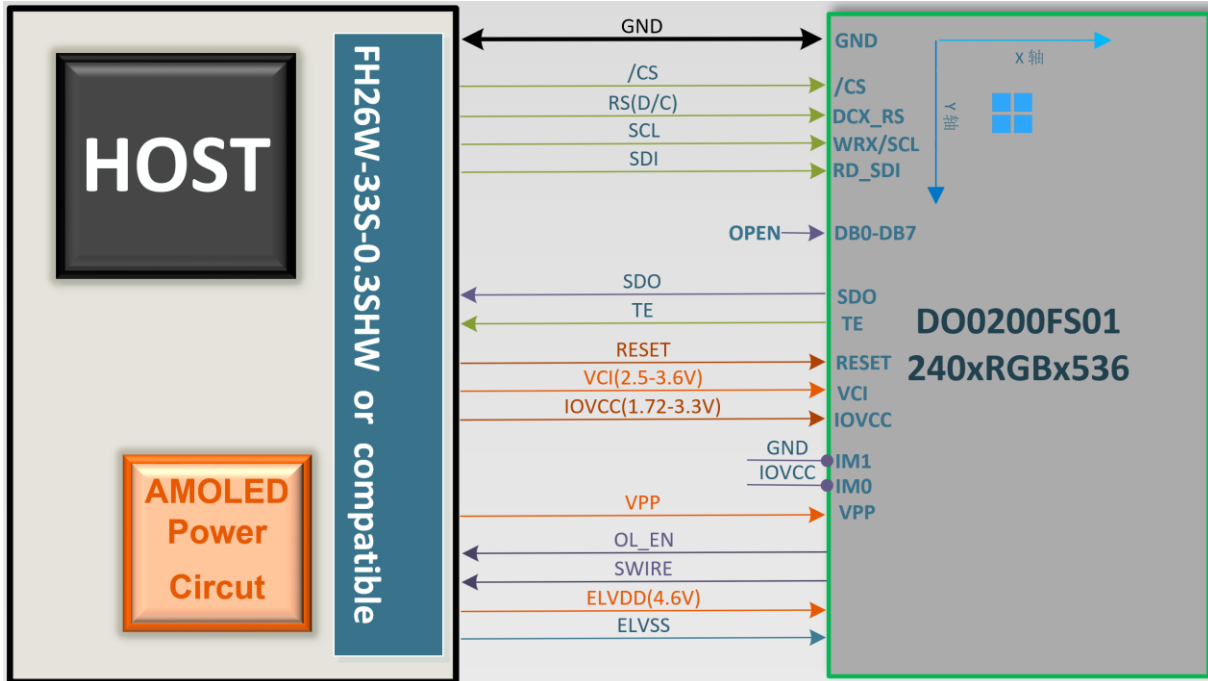
Item	Specifications	Unit
Dimensional outline	22.4(W) x 51.32(H)	mm
Thickness	0.89	mm
Number of dots	240(W) x RGB x 536(H)	Dots
Active area	19.80(W) x 44.22(H)	mm
Diagonal Inch	2.0	inch

***See attached drawing for details.**

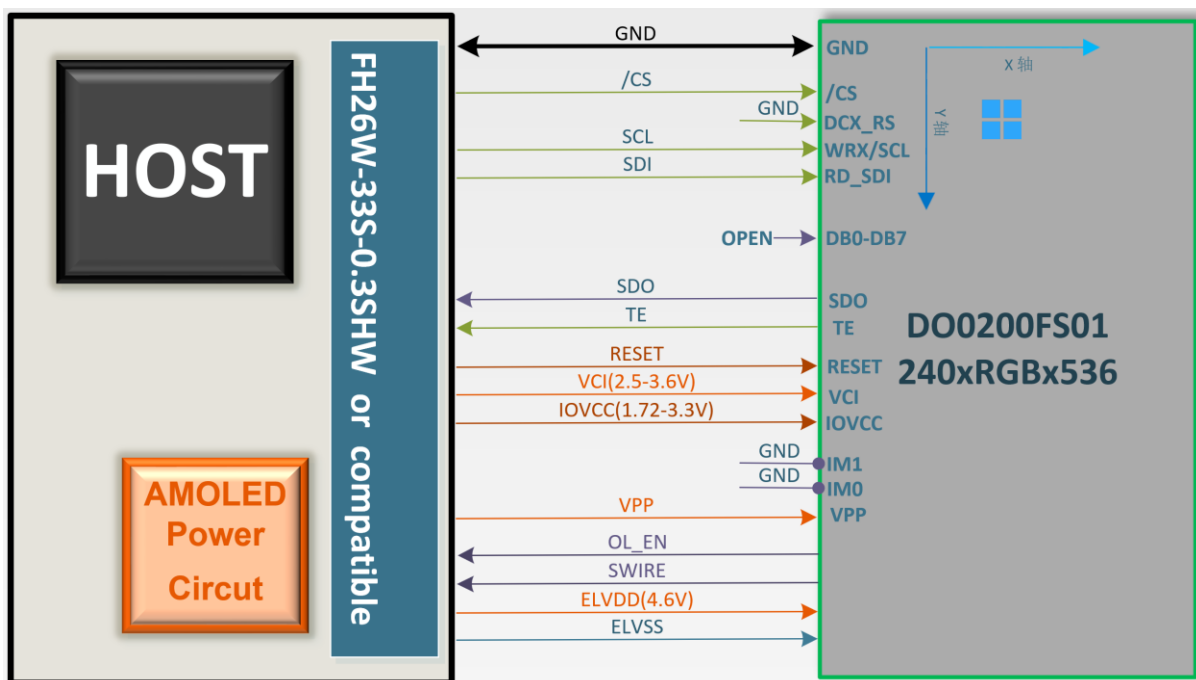
3.Block Diagram

DO0200FS01 support various interfaces, and interfaces are selected by setting the **IM[2:0]** pins.

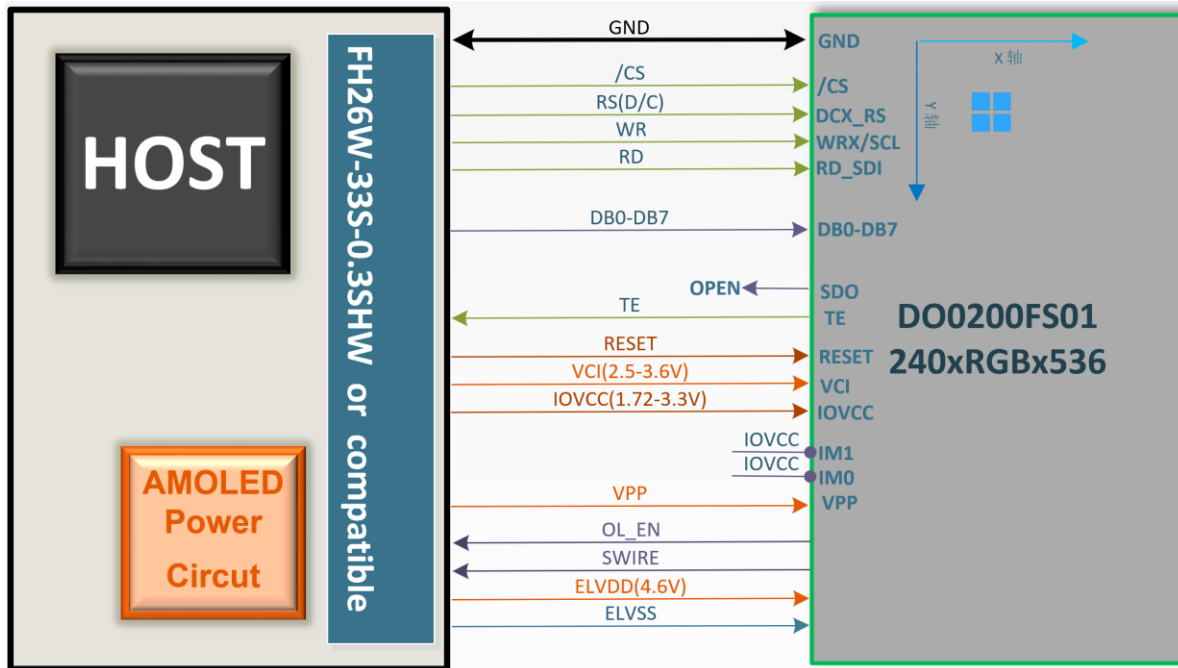
A: If IM1=GND,IM0=IOVCC, DO0200FS01 set to **spi-4wire interface**



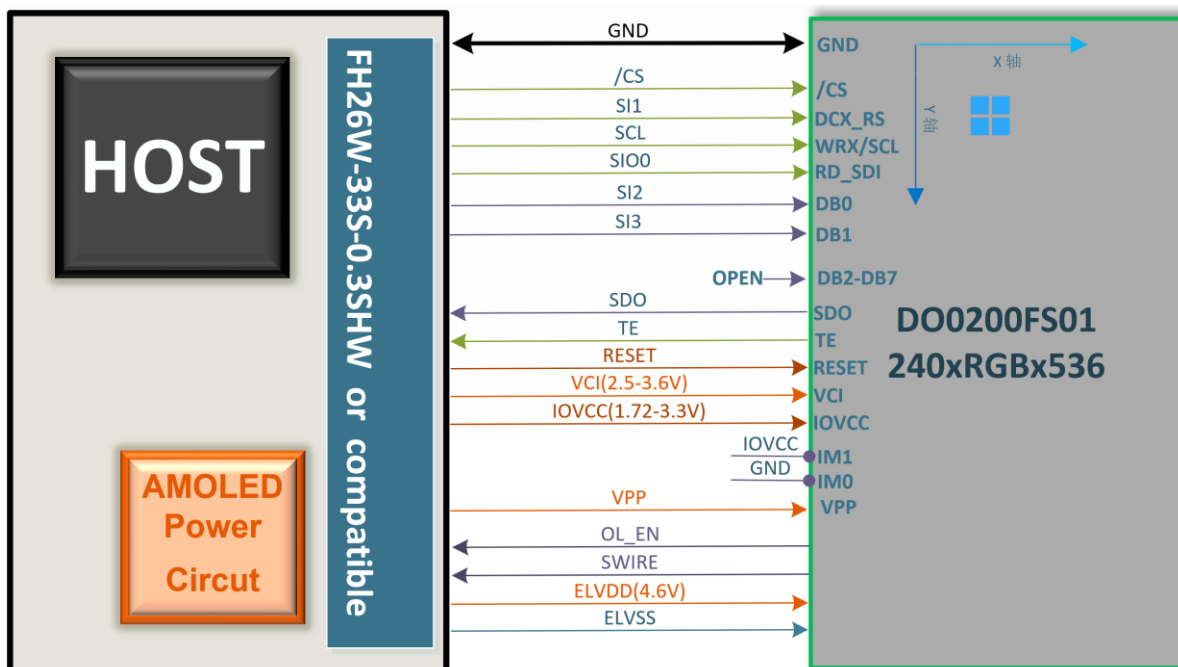
B: If IM1=GND,IM0=GND, DO0200FS01 set to **spi-3wire interface**



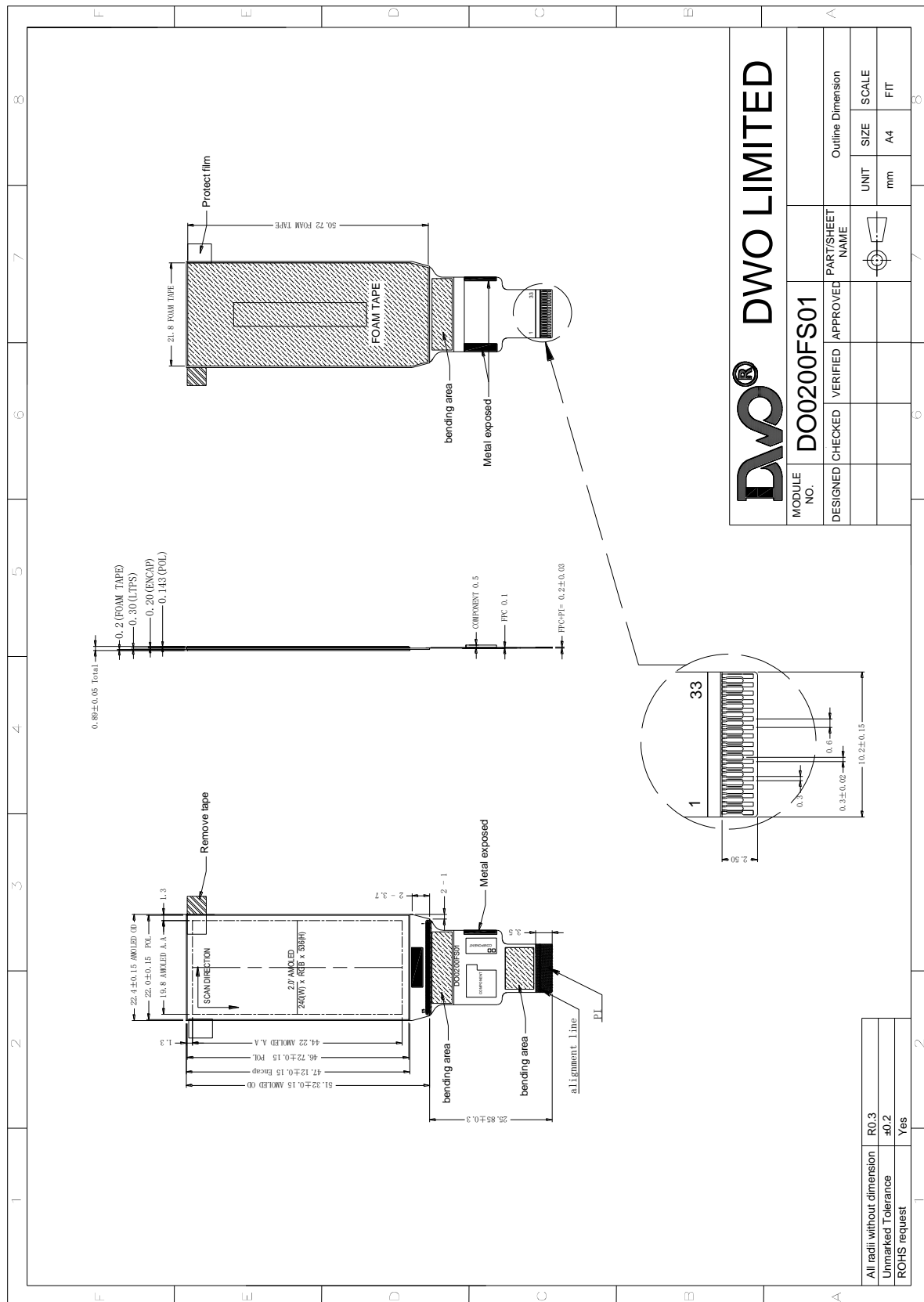
C: If IM1=IOVCC,IM0=IOVCC, DO0200FS01 set to **i8080-8bits interface**



D: If IM1=IOVCC,IM0=GND, DO0200FS01 set to **QSPI interface**



4.Dimension



5.Pin Description

NO.	Pin Name	I/O	Description
1-5	NC	-	No Connect
6	GND(0V	P	Ground Terminal
7	VDD	P	Analog Voltage for Driver (2.6~3.3V)
8	IOVCC	P	Driver IC Digital I/O Power Supply(1.7~3.3V)
9	SWIRE	O	Swire protocol setting pin of Power IC
10	OL_EN	O	Power IC enable control pin
11	TE	O	Tearing Effect
12	RESET	I	AMOLED Reset signal Input
13	SDO	O	Serial output signal in SPI I/F.
14	RD_SDI	P	SDI: Serial input signal in SPI I/F. The data is input on the rising edge of the SCL signal. RDX : Reads strobe signal to write data when RDX is "Low" in 80-series MPU interface.
15	DCX_RS	P	Display data / command selection in 80-series MPU I/F and 4-wire SPI I/F. D/CX = "0" : Command D/CX = "1" : Display data or Parameter
16	WRX_SCL	P	WRX : Writes strobe signal to write data when WRX is "Low" in 80-series MPU I/F. SCL: A synchronous clock signal in SPI I/F.
17	CS	P	Chip select input pin ("Low" enable) in 80-series MPU I/F and SPI I/F.
18	DB0	I/O	Bi-directional data bus for 80-series MPU I/F
19	DB1	I/O	Bi-directional data bus for 80-series MPU I/F
20	DB2	I/O	Bi-directional data bus for 80-series MPU I/F
21	DB3	I/O	Bi-directional data bus for 80-series MPU I/F
22	DB4	I/O	Bi-directional data bus for 80-series MPU I/F
23	DB5	I/O	Bi-directional data bus for 80-series MPU I/F
24	DB6	I/O	Bi-directional data bus for 80-series MPU I/F
25	DB7	I/O	Bi-directional data bus for 80-series MPU I/F
26	IM1	I	Interface type selection
27	IM0	I	Interface type selection
28	GND	P	Ground Terminal

29	VPP	P	OTP Power Supply(Let it open)
30	ELVDD	P	AMOLED power positive
31	ELVDD	P	
32	ELVSS	P	AMOLED power negative
33	ELVSS	P	

Note: The connections of IM[1:0] which not shown in table are invalid

IM[1:0]	Display Data	Command
00	3-wire SPI	3-wire SPI
01	4-wire SPI	4-wire SPI
10	QSPI	QSPI
11	I8080- 8-bit	I8080- 8-bit

6. DC Characteristics

6-1 Power Characteristic:

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit	Remark
Power supply for Logic	VDDIO		1.65	1.8	3.3	V	
Power supply for Analog	VCI		2.7	2.8	3.6	V	
AMOLED power positive	ELVDD		4.5	4.6	4.7	V	
AMOLED power negative	ELVSS		5.2	-4.9	-2.0	V	

1) Normal Mode

Power Supply: IOVCC=1.8V VCI=2.8V Vbat=3.7V

Frame Frequency: $F_{frame} = 60\text{Hz}$ @ 25degC, Brightness 350 nits, Command Mode,

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit	Remark
Current for VDDIO	Ivddio		-	6.5	7.8	mA	
Current for VCI	Ivci		-	6.0	7.2	mA	

2) Idle Mode

Power Supply: IOVCC=1.8V VCI=2.8V

Frame Frequency: $F_{frame} = 15\text{Hz}$ @ 25degC, Brightness 50 nits,

Display Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
10% Pixel On 50 nits						
	IVCI	-	3	3.6	mA	Ref
	IVDDIO	-	1	1.2	mA	Ref

3) Sleep Mode

Display Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
Deep Standby	IVCI	-	0.25	0.30	mA	-
	IVDDIO	-	0.10	0.12	mA	-

7. Electro-optical characteristics

Item		Symbol	Condition	Value			Unit	Remark
				Min	Typ	Max		
Luminance		L	θ=0° Φ=0° without CG	315	350	385	cd/m2	
Uniformity				85	90	-	%	Note 2
Viewing Angle	Left	θ _L	Cr≥200	80	85	-	Deg.	
	Right	θ _R		80	85	-		
	Top	ψ _T		80	85	-		
	Bottom	ψ _B		80	85	-		
Contrast Ratio		CR	θ=0°	5000	10000	-	-	
Adobe cover Ratio		SOR	ICE1931	-	100	-	%	Note 1
Response Time		Tr+Tf	Φ=0°	-	2	4	ms	
Color Coordinate of CIE1931	Red	X	θ=0° Φ=0°	0.64	0.67	0.70	-	
		Y		0.30	0.33	0.36		
	Green	X		0.17	0.21	0.25		
		Y		0.69	0.73	0.77		
	Blue	X		0.11	0.14	0.17		
		Y		0.01	0.04	0.07		
	White	X		0.28	0.30	0.32		
		Y		0.29	0.31	0.33		
NTSC Ratio		NTSC	CIE1931	100	103	-	%	
Color Uniformity		Δ u′	θ=0 deg. Condition 1	-	-	0.007	Δ u′	Note 2
		Δ v′				0.007	Δ u′	
Flicker		-	60Hz, Worst pattern	-	-30	-	dB	
Gamma		-	θ=0 deg.	2.0	2.2	2.4		
Crosstalk			-	-	-	TBD	%	Note 3
Color temperature		CT		6700	7500	8300	K	
Luminance decrease ratio of full white			θL=30°		40	45	%	
			θR=30°		40	45	%	
			ψT=30°		40	45	%	
			ψB=30°		40	45	%	
White color shift		WAD	G255, 0 to 45 deg.	-	-	0.022	Δ u′v′	Note 4

Measurements condition as below, if not otherwise specified. Include touchpanel, OCA and Cover glass

Room temp: 25°C, Frame frequency=60Hz

Image Enhancement :OFF

Measurement points: Display center, $\theta=0$ deg.

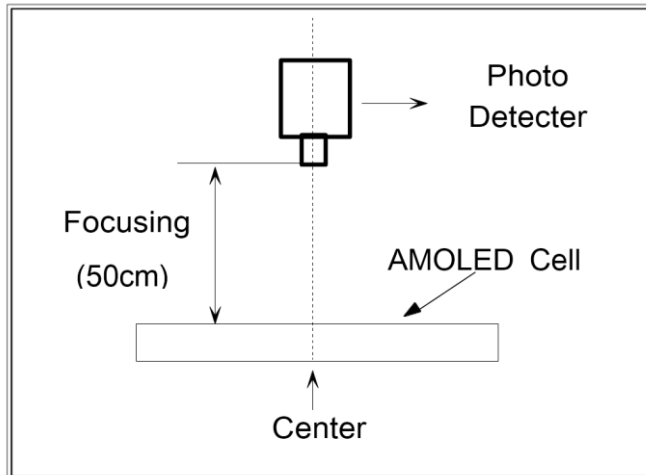
Measurement instrument: Uniformity CA2500,

Flicker CA310 or equivalent device. Other items CS2000

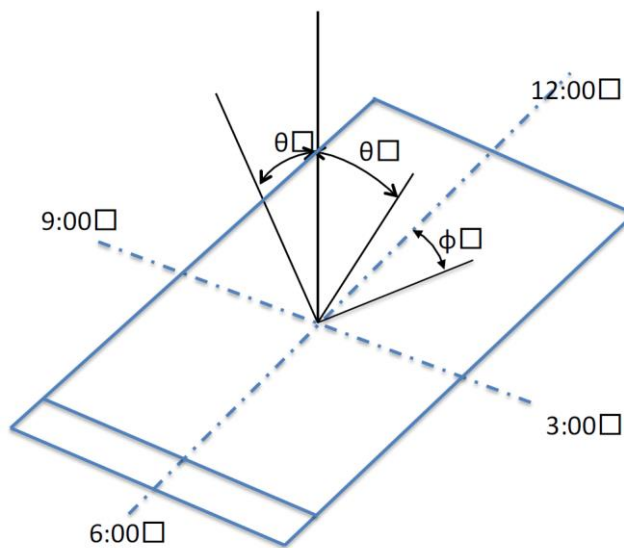
CS2000: To be measured on the center area of Panel with a viewing cone of 1° by luminance mater, after 15min operation

CA2500: To be measured on the Active area of Panel with a viewing cone of 35pixel/circle by luminance mater, after 15min operation

CA310: To be measured on “CA-P32/35” Probe



Viewing angle



Note1: Define of Adobe cover ratio

Green: RGB color chromaticity of this module

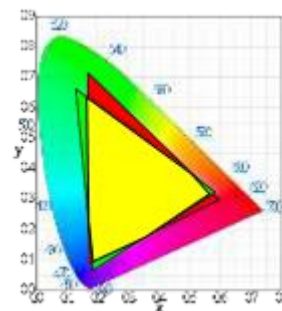
Rad : RGB color chromaticity of Adobe RGB

R: x0.64, y0.330

G: x0.21, y0.71

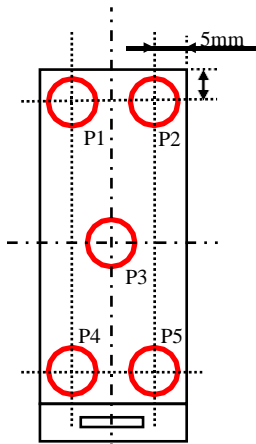
B: x0.15, y0.06

Yellow : The area where red and yellow are piled



Adobe RGB cover Ratio = Yellow / Rad *100[%]

Note2: Define of Brightness uniformity and Color uniformity



$$\text{Brightness uniformity} = \frac{\text{Minimum value}[P1:P5]}{\text{Maximum value}[P1:P5]}$$

$$\text{Color uniformity} = \text{Maximum value}[P1:P5] - \text{Minimum value}[P1:P5]$$

Note3: Define of Brightness uniformity and Color uniformity

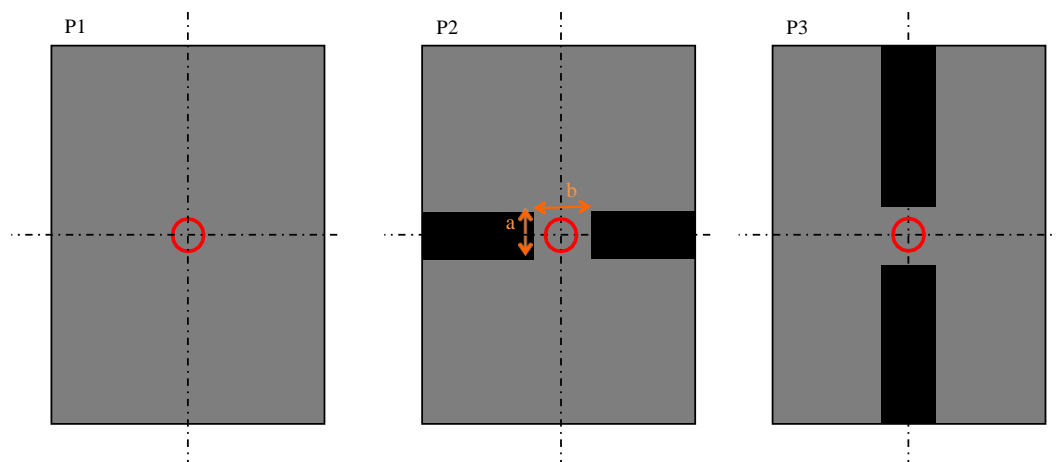
Define of crosstalk

Base color : V127

Measurement area (a,b) :

144dots*144dots Bar color :

white, red, green, blue, Black.



$$\text{Cross talk ratio P2} = \frac{|P1-P2|}{P1}$$

$$\text{Cross talk ratio P3} = \frac{|P1-P3|}{P1}$$

Cross talk ratio: maximum value of cross talk P2 and P3

Note4: Define of White color shift

White color shift is Maximum value of Color shift $WADu'$ and Color shift $WADv'$

$$WADu' = |u'_{0} - u'_{45}|$$

$$WADv' = |v'_{0} - v'_{45}|$$

$$\Delta u'v' = \sqrt{WADu'^2 + WADv'^2}$$

u'_{0}, v'_{0} : white color chromaticity at $\Theta = 0^\circ$

u'_{45}, v'_{45} : white color chromaticity at $\Theta = 45^\circ$ ($\varphi = \text{all angle}$)

8. Recommended Operating Sequence

Please refer to "Application Note of DO0200FS01.pdf"

9. AC characteristics

Please refer to "Application Note of DO0200FS01.pdf"

10. Standard Specification For Reliability

No	Item	Condition	qty	Result	Judgment Criterion
1	High Temperature Storage	80°C 72hrs	5	OK	After the test, keep the samples in the room temperature for 2h, and then inspect the visual and the electronics function
2	Low Temperature Storage	-40°C 72hrs	5	OK	1. No clearly visible defects or remarkable deterioration of display quality. However, any polarizer's deteriorations by the high temperature/ High humidity Storage test and the High temperature/ High humidity Operation test are permitted.
3	Temperature Humidity Bias	55°C/95%RH 72hrs	5	OK	2. No function-related abnormalities (such as TP NG, display strip, blurred screen, black display) 3. Optical criteria : .White $\Delta u'v' \leq 0.02$
4	ESD	Air Edge $\pm 8kV$ / Center $\pm 15kV$ Contact Edge $\pm 6kV$ / Center $\pm 8kV$	10	OK	1. No visible defects (optical / mechanical) 2. No function-related abnormalities

Note: The results must be measured after 2 hours later under room temperature keeping.

- END -