Product Specification

- **Product Name: AMOLED**
- **Model Name: DO0370PWR04**
- **Description:3.7inch Visual WVGA(480x800)**

Proposed by			Customer's Approval
Designed	Checked	Approved	

Document Revision History

Rev. No.	Date	Contents	Remark
0.0	2023-04-27	-.Initial issue	Preliminary

1.General Description:

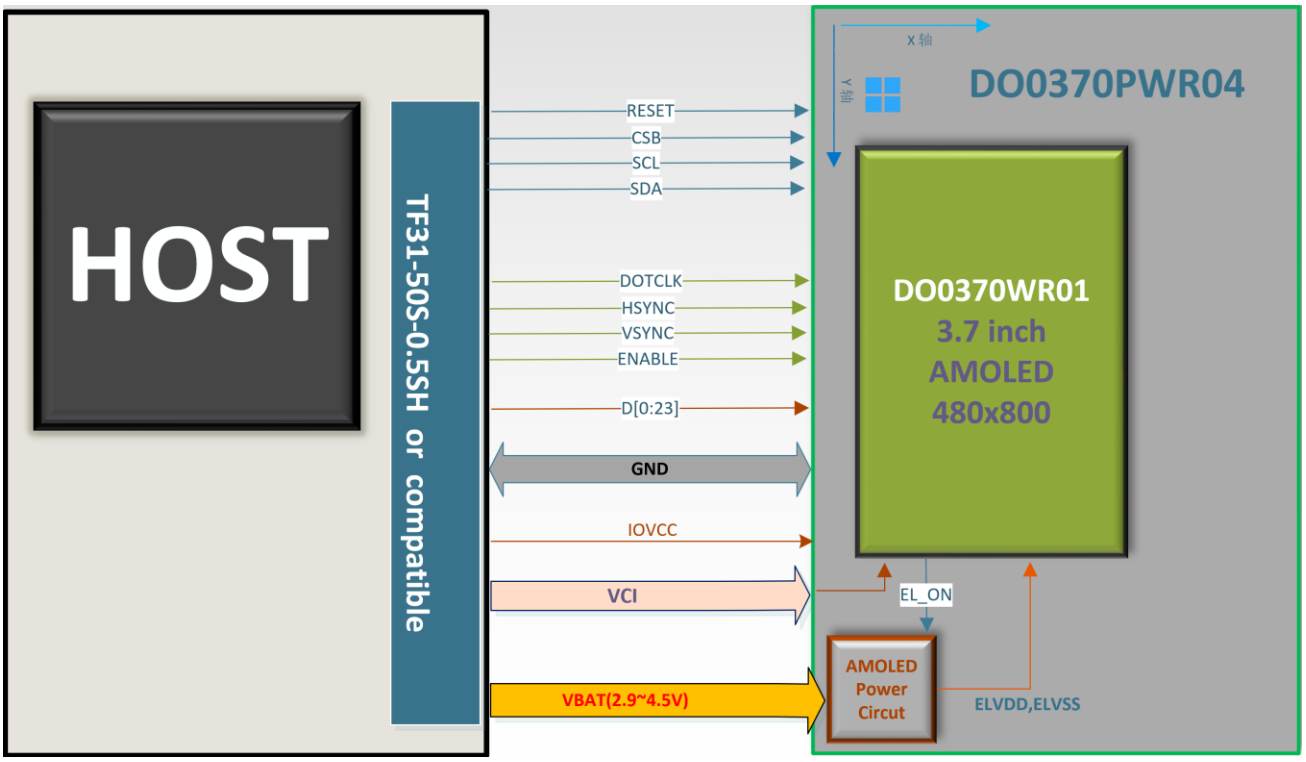
- Driving Mode: Active Matrix.
- Color Mode: Full Color (16.7M color)
- Display Format: 3.7" Visual WVGA-480 x 800
- Driver IC : TL2796
- Interface: RGB-24bits, SPI-3 line
- Application: Handheld & PDA
- RoHS Compatible

2.Mechanical Data

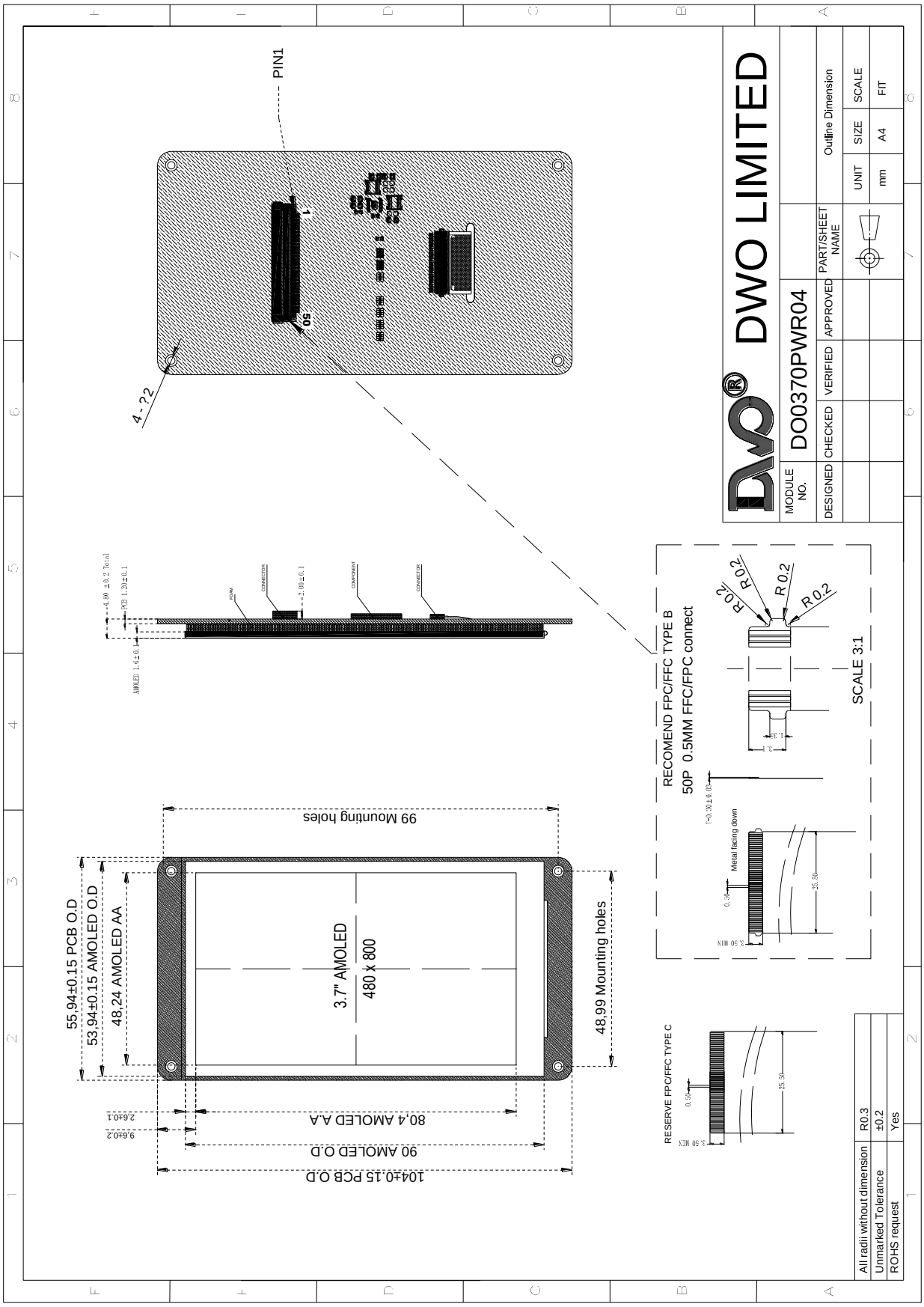
Item	Specifications	Unit
Dimensional outline(X*Y)	55.94(W) * 104(H) * Thickness	mm
Thickness	Total 4.8(T) --- AMOLED=1.6mm; --- Foam=2.0mm; --- PCB=1.2mm	mm
Resolution	480(W) x800(H)	Dots
Active area	48.24(W) X80.4(H)	mm
Diagonal Inch	3.7	inch

***See attached drawing for details.**

3.Block Diagram



4.Dimension


DWO LIMITED
DO0370PWR04
MODULE NO.
DESIGNED
CHECKED
VERIFIED
APPROVED
PART/SHEET NAME
Outline Dimension
UNIT
mm
SIZE
A4
SCALE
FIT
PIN1
4-?2
99 Mounting holes
55,94±0.15 PCB O.D
53,94±0.15 AMOLED O.D
48,24 AMOLED AA
3.7" AMOLED
480 x 800
48,99 Mounting holes
80,4 AMOLED A.A
90 AMOLED O.D
104±0.15 PCB O.D
RECOMEND FPC/FFC TYPE B
50P 0.5MM FFC/FPC connect
SCALE 3:1
RESERVE FPC/FFC TYPE C
All radii without dimension
Unmarked Tolerance
ROHS request
R0.3
±0.2
Yes

5.Pin Description

Main FPC assignment- AMOLED Panel Input/output Signal Interface.
Recommended 50pins 0.5MM FFC/FPC connect to DO0370PWR04,and
DO0370PWR04 exclusive the FFC/FPC.

NO.	Pin Name	I/O	Description
1	GND	P	Ground Terminal
2	VBAT	P	Power supply for AMOLED(2.9-4.5V,3.8V TYP.)
3	VBAT	P	
4	VCI	P	Analog Voltage for Driver (2.5~3.3V)
5	IOVCC	P	Power supply for I/O(1.7-3.3V)
6	GND	P	Ground Terminal
7	SPI_RESET	I	Reset Signal (0: reset, 1: normal operation) for Display.
8	SPI_SDO	O	Serial data output pin
9	SPI_SDI	I	Serial data input pin
10	SPI_SCK	I	Serial data transfer clock input pin
11	DEN	I	Data enable signal pin for RGB I/F.
12	HSYNC	I	Horizontal sync signal of the RGB I/F
13	VSYNC	I	Vertical sync signal of the RGB I/F
14	DCLK	I	Dot clock signal of the RGB I/F
15	D00	I	Data Bus of the RGB Interface(LSB).
16	D01	I	Data Bus of the RGB Interface.
17	D02	I	Data Bus of the RGB Interface.
18	D03	I	Data Bus of the RGB Interface.
19	D04	I	Data Bus of the RGB Interface.
20	D05	I	Data Bus of the RGB Interface.
21	D06	I	Data Bus of the RGB Interface.
22	D07	I	Data Bus of the RGB Interface.
23	D08	I	Data Bus of the RGB Interface.
24	D09	I	Data Bus of the RGB Interface.
25	D10	I	Data Bus of the RGB Interface.
26	D11	I	Data Bus of the RGB Interface.
27	D12	I	Data Bus of the RGB Interface.
28	D13	I	Data Bus of the RGB Interface.
29	D14	I	Data Bus of the RGB Interface.
30	D15	I	Data Bus of the RGB Interface.
31	D16	I	Data Bus of the RGB Interface.
32	D17	I	Data Bus of the RGB Interface.
33	D18	I	Data Bus of the RGB Interface.

34	D19	I	Data Bus of the RGB Interface.
35	D20	I	Data Bus of the RGB Interface.
36	D21	I	Data Bus of the RGB Interface.
37	D22	I	Data Bus of the RGB Interface.
38	D23	I	Data Bus of the RGB Interface.
39	SPI_CS	I	Chip select signal input (Low Active)
40	GND	P	Ground Terminal
41	GND	P	Ground Terminal
42	NC	-	Let it open
43	NC	-	Let it open
44	NC	-	Let it open
45	NC	-	Let it open
46	NC	-	Let it open
47	NC	-	Let it open
48	NC	-	Let it open
49	NC	-	Let it open
50	GND	P	Ground Terminal

Note:

The 50Pins connector(TF31-50S-0.5SH) on DO0370PWR04, bottom contact.

3-Wire Serial interface is used to setting the register,

RGB interface is used to transferring the display data.

6. DC Characteristics

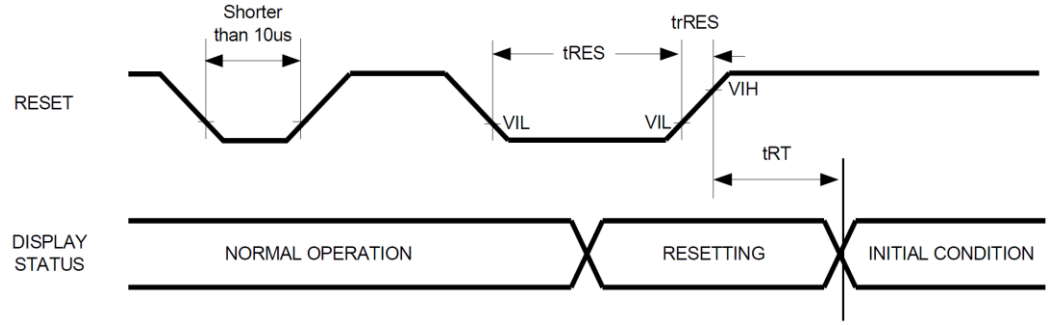
Test Conditions :Voltage Referenced to VSS=0V, IOVCC = 1.8V, VCI=3.3V,TA = 25℃
Unless otherwise specified

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	IOVCC	-	1.65	1.8	3.3	V
		VCI	-	2.5	2.9	3.4	
	Power	VBat	-	2.9	3.8	4.5	
Input Voltage	"H" level	VIH	-	0.8*IOVCC	-	IOVCC	V
	"L" level	VIL	-	-0.2	-	0.2*IOVCC	
Output Voltage	"H" level	VOH	IOH = -0.1mA IOL = 0.1mA	0.8*IOVCC	-	IOVCC	V
	"L" level	VOL		-0.2	-	0.2*IOVCC	
Leakage Current	Input	ILI	Vin=IOVCC or VSS	-1.0	-	1.0	uA
	Output	ILO		-3.0	-	3.0	uA
Supply Current	EL Power ($250cd/m^2$, full white)	IBAT	VBAT=3.8V	-	320	380	mA
Driver IC Current Consumption		IOVCC	IOVCC =VCI=2.8V	-	-	1	mA
		IVCI		-	-	20	mA
		Istby(VBAT =3.8V)	IOVCC =VCI=2.8V	-	-	200	uA

7.AC characteristics

7-1 Reset Timing

Reset timing characteristic



VSS=0V, VDDIO=1.7V to 3.3V, VCI=2.5V to 3.3V,Ta = -30 to 70℃

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	tRES	us	10	-	-
Reset rise time	trRES	us	-	-	2
Reset cancel	tRT	ms			1

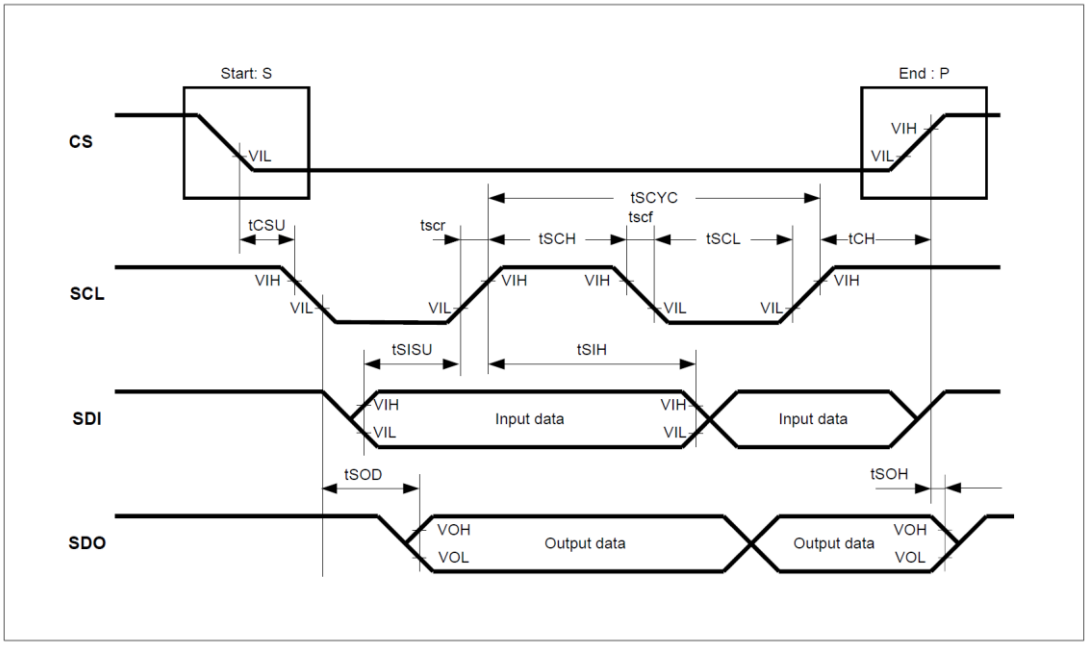
Ref code: RESET=0; delay_ms(1);

RESET=1; delay_ms(1);

RESET=0; delay_ms(10);

RESET=1; delay_ms(60);

7-2 SPI Interface

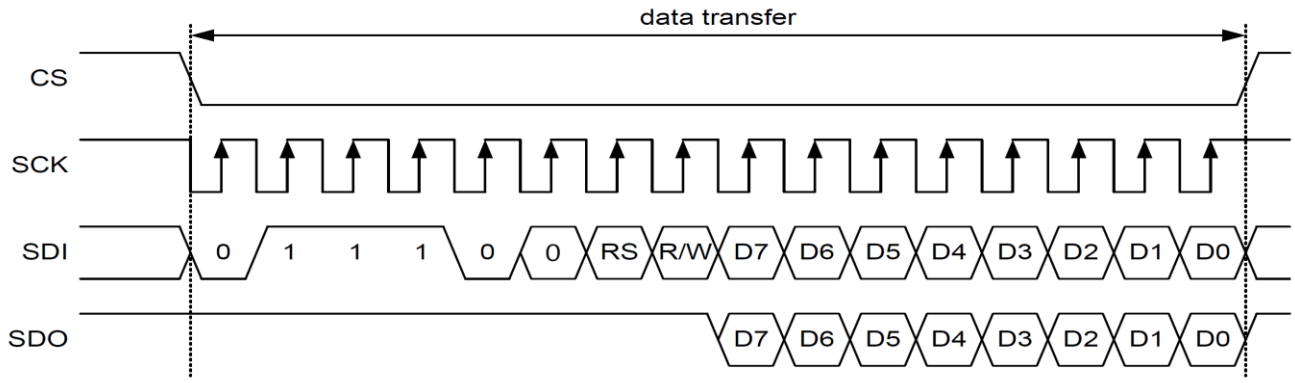


SPI Interface Characteristics

IOVCC=1.7 to 3.3V, VCC= 2.5 to 3.3V operation

Item		Symbol	Min.	Typ.	Max.	Unit
Serial clock cycle time	Write (received)	tSCYC	100	-	-	ns
	Read (transmitted)	tSCYC	350	-	-	ns
Serial clock high-level pulse width	Write (received)	tSCH	40	-	-	ns
	Read (transmitted)	tSCH	150	-	-	ns
Serial clock low-level pulse width	Write (received)	tSCL	40	-	-	ns
	Read (transmitted)	tSCL	150	-	-	ns
Serial clock rise/fall time		tSCr, tSCf	-	-	20	ns
Chip select set up time		tCSU	20	-	-	ns
Chip select hold time		tCH	60	-	-	ns
Serial input data set up time		tSISU	30	-	-	ns
Serial input data hold time		tSIH	30	-	-	ns
Serial output data delay time		tSOD	-	-	130	ns
Serial output data hold time		tSOH	5	-	-	ns

SPI Interface Timing



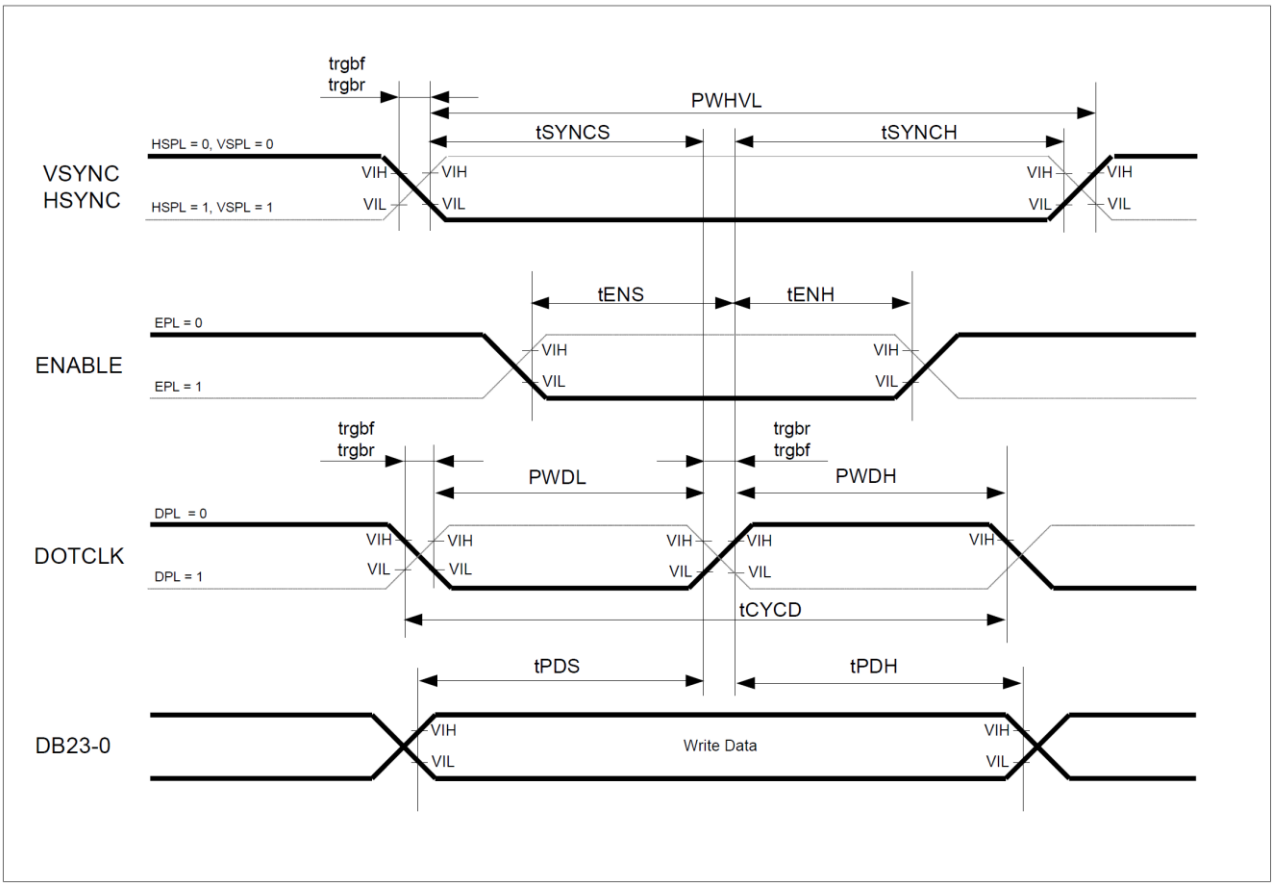
Ref Code:

```
void Spi_SendData(unsigned int i)    // SPI SUB FUNCTION 1
{
   unsigned char n;
      for(n=0; n<8; n++)
      {
      if(i&0x80)set_sda();    // SPI_DI=1;
      else         clr_sda();    //SPI_DI=0;
      i<<= 1;
      clr_clk();
```

```
        set_clk();
        }
}
void Spi_Write_Command(int reg_H,int reg_L) // SPI SUB FUNCTION 2
{
   int j,k;
   int    addr=0x70;
   clr_cs();
   Spi_SendData(addr);
   Spi_SendData(reg_H);
   Spi_SendData(reg_L);
   set_cs();
}
void Spi_Write_Data(int par_H,int par_L)
{
int j,k;
int    addr=0x72;

clr_cs();
Spi_SendData(addr);
Spi_SendData(par_H);
Spi_SendData(par_L);
set_cs();
}
void Write_CmdData_SPI_16bits(unsigned int cmd,unsigned int data)
{
clr_cs();
Spi_SendData(0x70);
Spi_SendData(cmd);
set_cs();
clr_cs();
Spi_SendData(0x72);
Spi_SendData(data);
```

```
set_cs();
}
```

7-3 RGB Interface



RGB interface(16/18/24-bit), IOVCC=1.65 to 3.3V, VCC= 2.4 to 3.3V operation

Item	Symbol	Min.	Typ.	Max.	Unit
VSYNC / HSYNC “Low” level pulse width	PWHVL	1	-	-	DOTCLK
VSYNC / HSYNC set up time	tSYNCS	10	-	-	ns
VSYNC / HSYNC hold time	tSYNCH	10	-	-	ns
ENABLE set up time	tENS	10	-	-	ns
ENABLE hold time	tENH	10	-	-	ns
DOTCLK ”Low” level pulse width	PWDL	10	-	-	ns
DOTCLK ”High” level pulse width	PWDH	10	-	-	ns
DOTCLK cycle time	tCYCD	30	-	-	ns
Data set up time	tPDS	7	-	-	ns
Data hold time	tPDH	7	-	-	ns
DOTCLK, VSYNC, HSYNC rising, falling time	trgbr, trgbf	-	-	15	ns

Note 1) Above AC characteristics condition is in case of VCCL >= 1.8V irrespective of VCC.

RGB Interface Pin Map

Pad name	24 bits configuration	18 bits configuration	16 bits configuration
D23	R7	R5	R4
D22	R6	R4	R3
D21	R5	R3	R2
D20	R4	R2	R1
D19	R3	R1	R0
D18	R2	R0	R4/ Not used
D17	R1	R5/ Not used	R3/ Not used
D16	R0	R4/ Not used	R2/ Not used
D15	G7	G5	G5
D14	G6	G4	G4
D13	G5	G3	G3
D12	G4	G2	G2
D11	G3	G1	G1
D10	G2	G0	G0
D9	G1	G5/ Not used	G5/ Not used
D8	G0	G4/ Not used	G4/ Not used
D7	B7	B5	B4
D6	B6	B4	B3
D5	B5	B3	B2
D4	B4	B2	B1
D3	B3	B1	B0
D2	B2	B0	B4/ Not used
D1	B1	B5/ Not used	B3/ Not used
D0	B0	B4/ Not used	B2/ Not used

8. Recommended Operating Sequence

STEP 1---[Power On]

STEP 2---[Activate Reset] Driver IC

STEP 3---[SPI Configure AMOLED Register]

STEP 4---[24Bit RGB Bus send Display data]

8-1. Power ON sequence

STEP 1---[Power On]

（1）turn-ON VBAT (+3.8VDC)

（2）turn-ON IOVCC (+1.8VDC)

（3）turn-ON VCI (+3.3VDC)

Wait 10ms

STEP 2---[Activate Reset] TL2796

STEP 3---[SPI Configure AMOLED Register]

STEP 4---[RGB Interface Send AMOLED Display Data]

```
void AMOLED_Init(void) // www.dwo.net.cn
{
Write_CmdData_SPI_16bits(0x14, 0x00); //set display off
Write_CmdData_SPI_16bits(0x31, 0x08); //set display mode 24-bit parallel RGB (de)
Write_CmdData_SPI_16bits(0x32, 0x14); //set display mode
Write_CmdData_SPI_16bits(0x30, 0x02); //set driver capability
Write_CmdData_SPI_16bits(0x27, 0x01);

Write_CmdData_SPI_16bits(0x12, 0x08); //VBP= 8*HSYNK
Write_CmdData_SPI_16bits(0x13, 0x08); //VFP= 8*HSYNK
Write_CmdData_SPI_16bits(0x15, 0x01); //Active Low SYNK, Rising Clock
Write_CmdData_SPI_16bits(0x16, 0x00);

clr_cs();
Spi_SendData(0x70);
Spi_SendData(0xef);
set_cs();

clr_cs();
Spi_SendData(0x72);
```

```
Spi_SendData(0xd0);
set_cs();

clr_cs();
Spi_SendData(0x72);
Spi_SendData(0xe8);
set_cs();

//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39, 0x44); //Gamma set Select
delay_ms(1);
#ifdef Brightness_250
//////////////////250cd/m2//////////////////GAMMA2.2
Write_CmdData_SPI_16bits(0x40, 0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41, 0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42, 0x2a); //set R_V15
Write_CmdData_SPI_16bits(0x43, 0x27); //set R_V31
Write_CmdData_SPI_16bits(0x44, 0x27); //set R_V63
Write_CmdData_SPI_16bits(0x45, 0x1f); //set R_V127
Write_CmdData_SPI_16bits(0x46, 0x44); //set R_V255

Write_CmdData_SPI_16bits(0x50, 0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51, 0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52, 0x17); //set G_V15
Write_CmdData_SPI_16bits(0x53, 0x24); //set G_V31
Write_CmdData_SPI_16bits(0x54, 0x26); //set G_V63
Write_CmdData_SPI_16bits(0x55, 0x1f); //set G_V127
Write_CmdData_SPI_16bits(0x56, 0x43); //set G_V255

Write_CmdData_SPI_16bits(0x60, 0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61, 0x3f); //set B_V5
```

```
Write_CmdData_SPI_16bits(0x62, 0x2a); //set B_V15
Write_CmdData_SPI_16bits(0x63, 0x25); //set B_V31
Write_CmdData_SPI_16bits(0x64, 0x24); //set B_V63
Write_CmdData_SPI_16bits(0x65, 0x1b); //set B_V127
Write_CmdData_SPI_16bits(0x66, 0x5c); //set B_V255
#endif    //end of 250 cd/m2

//Power On Setting Sequence
Write_CmdData_SPI_16bits(0x17,0x22);    //Boosting Freq= 256*DOTCLK, 128*DOTCLK
Write_CmdData_SPI_16bits(0x18,0x33);    //Power OP-AMP's current rate= Medium
Write_CmdData_SPI_16bits(0x19,0x03);    //VLOUT2=3*VCI1OUT, VLOUT3=-4*VCI1OUT
Write_CmdData_SPI_16bits(0x1a,0x01);    //Gray Scale OP-AMP's rate = Medium
Write_CmdData_SPI_16bits(0x22,0xa4);    //Vinternal= 0.65*VCI
Write_CmdData_SPI_16bits(0x23,0x00);    //VCI1= 0.98*VCI
Write_CmdData_SPI_16bits(0x26,0xa0);    //dotclk    reference
//Stand-by Off
Write_CmdData_SPI_16bits(0x1d,0xa0); //Stand-by Off
delay_ms(200);
Write_CmdData_SPI_16bits(0x14,0x03); //set display on
delay_ms(20);
AMOLED_Clear(0x0000);
}    //end of AMOLED_Init
```

8-2. Power OFF sequence

（1） Sleep In Command (28h)
Wait 120ms

（2） Stand-by Off Command (10h)
Wait 120ms

（3） turn-OFF VCI (+3.3VDC)

（4） turn-OFF IOVCC (+1.8VDC)

（5） turn-OFF VBAT (+3.8VDC)

8-3 Gamma condition set---[Brightness set]

Five gamma register set for brightness control

#ifdef Brightness_250

```
//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39,0x44); //Gamma set Select
//////////////////250cd/m2//////////////////GAMMA2.2
Write_CmdData_SPI_16bits(0x40,0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41,0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42,0x2a); //set R_V15
Write_CmdData_SPI_16bits(0x43,0x27); //set R_V31
Write_CmdData_SPI_16bits(0x44,0x27); //set R_V63
Write_CmdData_SPI_16bits(0x45,0x1f); //set R_V127
Write_CmdData_SPI_16bits(0x46,0x44); //set R_V255

Write_CmdData_SPI_16bits(0x50,0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51,0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52,0x17); //set G_V15
Write_CmdData_SPI_16bits(0x53,0x24); //set G_V31
Write_CmdData_SPI_16bits(0x54,0x26); //set G_V63
Write_CmdData_SPI_16bits(0x55,0x1f); //set G_V127
Write_CmdData_SPI_16bits(0x56,0x43); //set G_V255

Write_CmdData_SPI_16bits(0x60,0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61,0x3f); //set B_V5
Write_CmdData_SPI_16bits(0x62,0x2a); //set B_V15
Write_CmdData_SPI_16bits(0x63,0x25); //set B_V31
Write_CmdData_SPI_16bits(0x64,0x24); //set B_V63
Write_CmdData_SPI_16bits(0x65,0x1b); //set B_V127
Write_CmdData_SPI_16bits(0x66,0x5c); //set B_V255

#endif  //end of Brightness_250
```

```
#ifdef  Brightness_200

//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39,0x33); //Gamma set Select
//////////////////200cd/m2//////////////////GAMMA2.2
Write_CmdData_SPI_16bits(0x40,0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41,0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42,0x28); //set R_V15
Write_CmdData_SPI_16bits(0x43,0x29); //set R_V31
Write_CmdData_SPI_16bits(0x44,0x27); //set R_V63
Write_CmdData_SPI_16bits(0x45,0x21); //set R_V127
Write_CmdData_SPI_16bits(0x46,0x3E); //set R_V255

Write_CmdData_SPI_16bits(0x50,0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51,0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52,0x10); //set G_V15
Write_CmdData_SPI_16bits(0x53,0x25); //set G_V31
Write_CmdData_SPI_16bits(0x54,0x27); //set G_V63
Write_CmdData_SPI_16bits(0x55,0x20); //set G_V127
Write_CmdData_SPI_16bits(0x56,0x3D); //set G_V255

Write_CmdData_SPI_16bits(0x60,0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61,0x3f); //set B_V5
Write_CmdData_SPI_16bits(0x62,0x28); //set B_V15
Write_CmdData_SPI_16bits(0x63,0x27); //set B_V31
Write_CmdData_SPI_16bits(0x64,0x25); //set B_V63
Write_CmdData_SPI_16bits(0x65,0x1D); //set B_V127
Write_CmdData_SPI_16bits(0x66,0x53); //set B_V255

#endif  //end of Brightness_200
```

```
#ifdef  Brightness_150

//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39,0x22); //Gamma set Select
//////////////////150cd/m2//////////////////GAMMA2.2
Write_CmdData_SPI_16bits(0x40,0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41,0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42,0x2D); //set R_V15
Write_CmdData_SPI_16bits(0x43,0x29); //set R_V31
Write_CmdData_SPI_16bits(0x44,0x28); //set R_V63
Write_CmdData_SPI_16bits(0x45,0x23); //set R_V127
Write_CmdData_SPI_16bits(0x46,0x37); //set R_V255

Write_CmdData_SPI_16bits(0x50,0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51,0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52,0x0B); //set G_V15
Write_CmdData_SPI_16bits(0x53,0x25); //set G_V31
Write_CmdData_SPI_16bits(0x54,0x28); //set G_V63
Write_CmdData_SPI_16bits(0x55,0x22); //set G_V127
Write_CmdData_SPI_16bits(0x56,0x36); //set G_V255

Write_CmdData_SPI_16bits(0x60,0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61,0x3f); //set B_V5
Write_CmdData_SPI_16bits(0x62,0x2B); //set B_V15
Write_CmdData_SPI_16bits(0x63,0x28); //set B_V31
Write_CmdData_SPI_16bits(0x64,0x26); //set B_V63
Write_CmdData_SPI_16bits(0x65,0x1F); //set B_V127
Write_CmdData_SPI_16bits(0x66,0x4A); //set B_V255

#endif  //end of Brightness_150
```

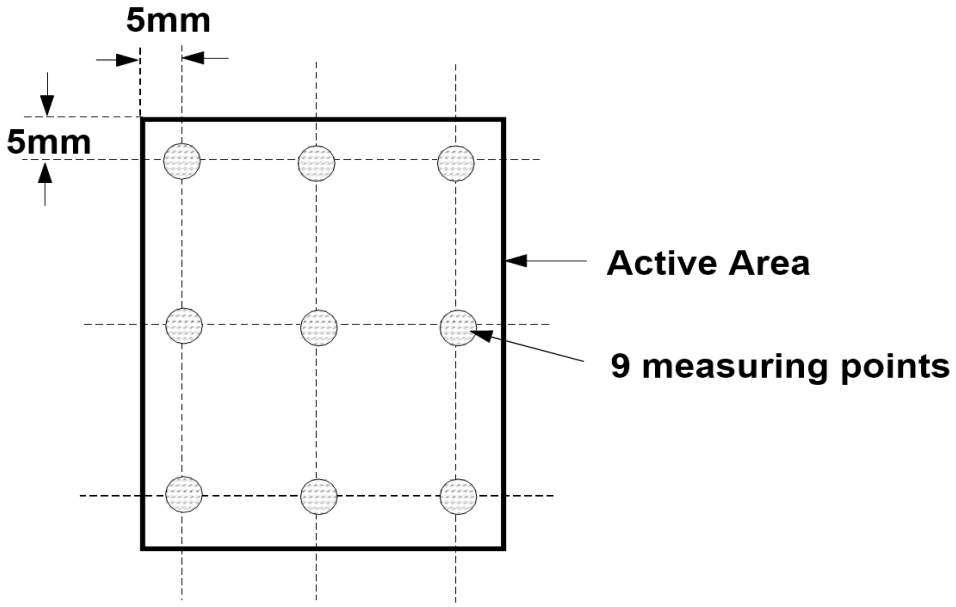
```
#ifdef  Brightness_100

//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39,0x11); //Gamma set Select
//////////////////100cd/m2//////////////////GAMMA2.2

Write_CmdData_SPI_16bits(0x40,0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41,0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42,0x30); //set R_V15
Write_CmdData_SPI_16bits(0x43,0x2A); //set R_V31
Write_CmdData_SPI_16bits(0x44,0x2B); //set R_V63
Write_CmdData_SPI_16bits(0x45,0x24); //set R_V127
Write_CmdData_SPI_16bits(0x46,0x2F); //set R_V255

Write_CmdData_SPI_16bits(0x50,0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51,0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52,0x00); //set G_V15
Write_CmdData_SPI_16bits(0x53,0x25); //set G_V31
Write_CmdData_SPI_16bits(0x54,0x29); //set G_V63
Write_CmdData_SPI_16bits(0x55,0x24); //set G_V127
Write_CmdData_SPI_16bits(0x56,0x2E); //set G_V255

Write_CmdData_SPI_16bits(0x60,0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61,0x3f); //set B_V5
Write_CmdData_SPI_16bits(0x62,0x2F); //set B_V15
Write_CmdData_SPI_16bits(0x63,0x29); //set B_V31
Write_CmdData_SPI_16bits(0x64,0x29); //set B_V63
Write_CmdData_SPI_16bits(0x65,0x21); //set B_V127
Write_CmdData_SPI_16bits(0x66,0x3F); //set B_V255

#endif  //end of Brightness_100
```

```
#ifdef  Brightness_50

//[Gamma Setting]
Write_CmdData_SPI_16bits(0x39,0x00); //Gamma set Select
//////////////////50cd/m2//////////////////GAMMA2.2
Write_CmdData_SPI_16bits(0x40,0x00); //set R_V0
Write_CmdData_SPI_16bits(0x41,0x3f); //set R_V5
Write_CmdData_SPI_16bits(0x42,0x3C); //set R_V15
Write_CmdData_SPI_16bits(0x43,0x2C); //set R_V31
Write_CmdData_SPI_16bits(0x44,0x2D); //set R_V63
Write_CmdData_SPI_16bits(0x45,0x27); //set R_V127
Write_CmdData_SPI_16bits(0x46,0x24); //set R_V255

Write_CmdData_SPI_16bits(0x50,0x00); //set G_V0
Write_CmdData_SPI_16bits(0x51,0x00); //set G_V5
Write_CmdData_SPI_16bits(0x52,0x00); //set G_V15
Write_CmdData_SPI_16bits(0x53,0x22); //set G_V31
Write_CmdData_SPI_16bits(0x54,0x2A); //set G_V63
Write_CmdData_SPI_16bits(0x55,0x27); //set G_V127
Write_CmdData_SPI_16bits(0x56,0x23); //set G_V255

Write_CmdData_SPI_16bits(0x60,0x00); //set B_V0
Write_CmdData_SPI_16bits(0x61,0x3F); //set B_V5
Write_CmdData_SPI_16bits(0x62,0x3B); //set B_V15
Write_CmdData_SPI_16bits(0x63,0x2C); //set B_V31
Write_CmdData_SPI_16bits(0x64,0x2B); //set B_V63
Write_CmdData_SPI_16bits(0x65,0x24); //set B_V127
Write_CmdData_SPI_16bits(0x66,0x31); //set B_V255

#endif  //end of Brightness_50
```

9.Electro-optical characteristics

Item		Symbol	Temp	Condition	Min.	Typ.	Max.	Unit	Note
Brightness			25℃	Normal (White Mode)	200	250	300	cd/m²	Center brightness
Uniformity			25℃	Normal (White Mode)	82	90	-	%	(1)
Contrast ratio		K	25℃	Φ=0°,θ=0°	2,000		-	-	(1),(2)
Color of CIE coordinate	White	x	25℃	Φ=0° θ=0°	0.280	0.300	0.320	-	(1),(2),(3)
		y			0.290	0.310	0.330	-	
	Red	x			0.625	0.675	0.725	-	
		y			0.275	0.325	0.375	-	
	Green	x			0.170	0.220	0.270	-	
		y			0.675	0.725	0.775	-	
	Blue	x			0.095	0.145	0.195	-	
		y			0.005	0.055	0.105	-	
Color Gamut			25℃	vs. NTSC	-	105	-	%	
Life Time(5)			25℃	50% Brightness drop @250cd/m², Full White	-	30,000	-	Hr	(4)

Note 1): Uniformity Measuring Point

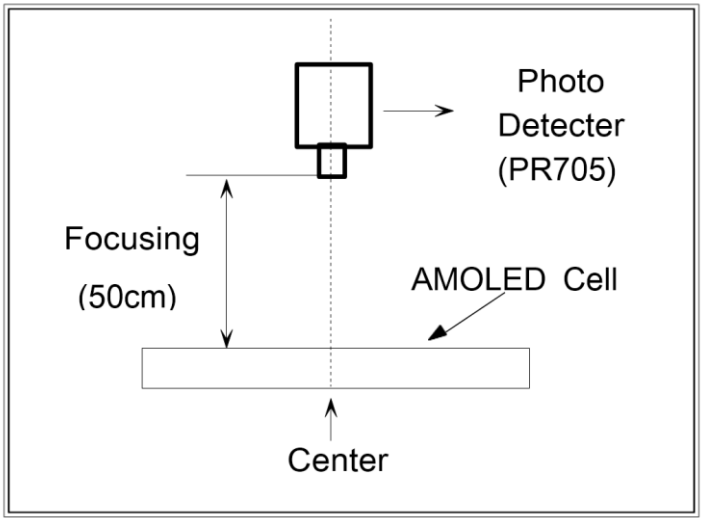


Uniformity = Lmin / Lmax * 100 [%]

Note 2): Definition of contrast ratio (K)

$$\text{Contrast Ratio(K)} = \frac{\text{Brightness of selected dot (White patterned area) at 250cd/m}^2}{\text{Brightness of non-selected dot (Black patterned area) at 250cd/m}^2}$$

Note 3): Optical measuring system： temperature regulated chamber



Note 4): Life Time

The elapsed time that the full white brightness decreases to the half of initial value

10. Standard Specification For Reliability

No	Item	Condition	Cycles	Judgment Criterion
1	High Temperature Operation	80℃/ 240hours	10	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. 2. No function-related abnormalities.
2	Low Temperature Operation	-30℃/ 240hours	10	
3	High Temperature Storage	85℃/ 240hours	5	
4	Low Temperature Storage	-30℃/ 240hours	5	
5	High Temperature Humidity Operation	60℃/90%RH/ 240hours	5	
6	Thermal Shock	-40℃~85℃ / 100cycles	5	

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

- END -