BOE

0.71 Inch Active Matrix Color OLED Panel Module

1. Overview/Application

B071FH8P01A0/F01A0 is a 0.71 inch diagonal, FHD resolution(1920 x1080), active matrix color OLED (Organic Light Emitting Display)panel module based on single crystal silicon backplane . The pixel circuits and driving IC are integrated on the silicon backplane to get the compact size and very low power consumption.

(Potential applications: Virtual Reality application（AR/VR）, Head mounted displays, Near-Eye Displays etc.)

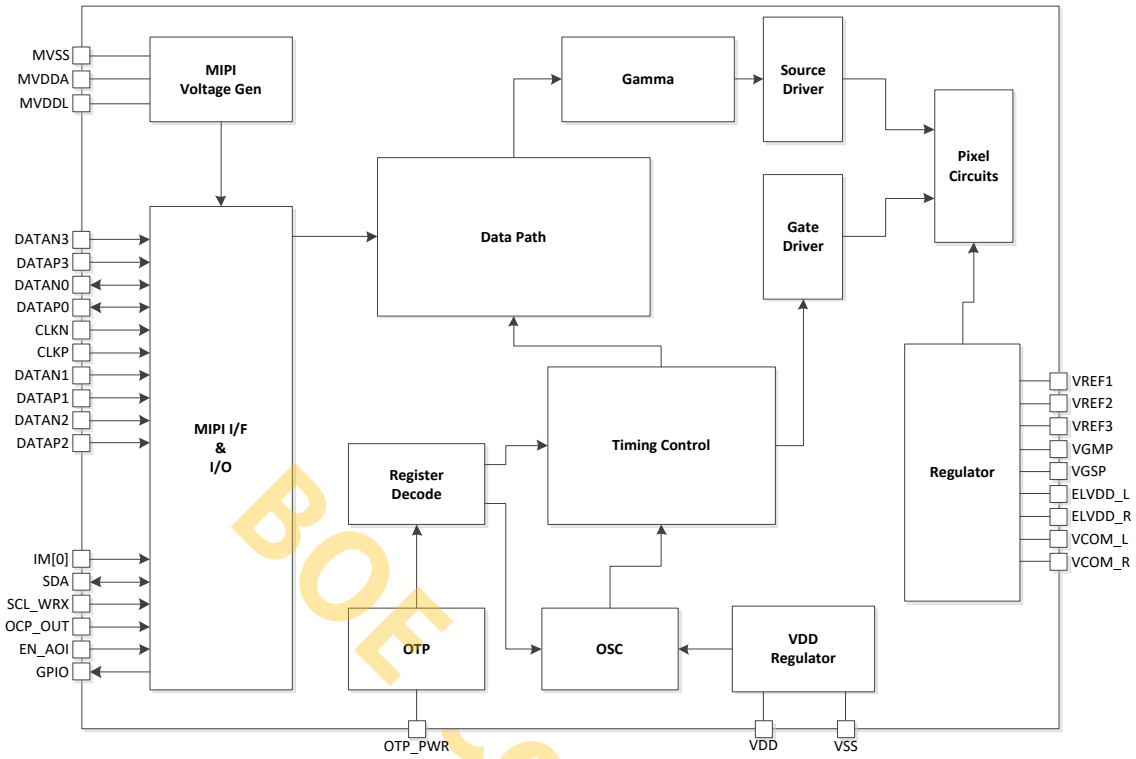
2. Features

- Small-size, high resolution 0.71 FHD Display PPI=3135
- AP Operated Resolution 1920 x 1080 up to 90Hz
- Full color mode，16.7M colors
- Fast response
- Thin and light in weight
- Color enhancement
- High contrast
- IR compensation with 2D
- Idle mode for save power
- Scan direction selection, up or down
- Interface，Support MIPI only or MIPI(data)+I^2C(CMD)
  Support VESA-DSC in-chip decoder (3X and 3.75X compression ratio)
  Support scaling up 1.33x (1440x810 to 1920 x 1080) and 1.5x (1280x720 to 1920 x 1080)
- Sequential/Global emission

3. Module Structure

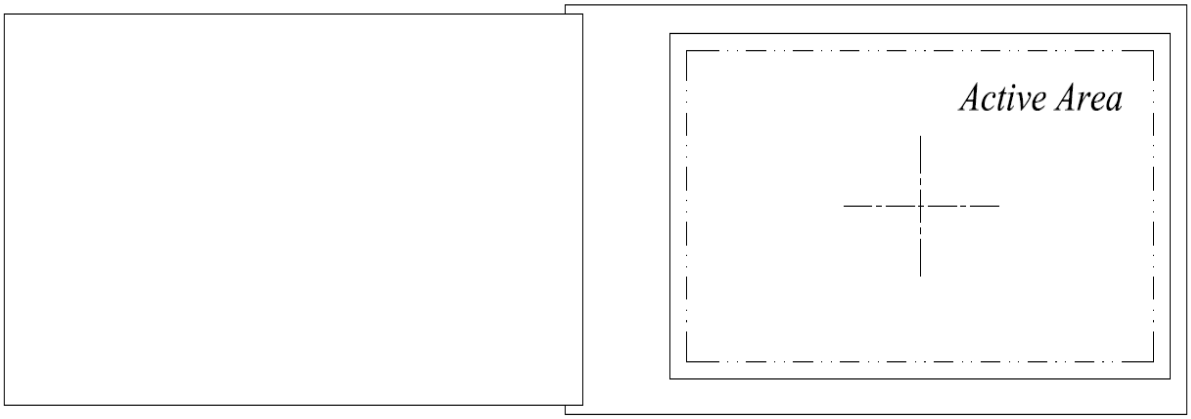
- Active matrix color OLED display with on-chip driver based on single crystal silicon transistors

4. System Block Diagram

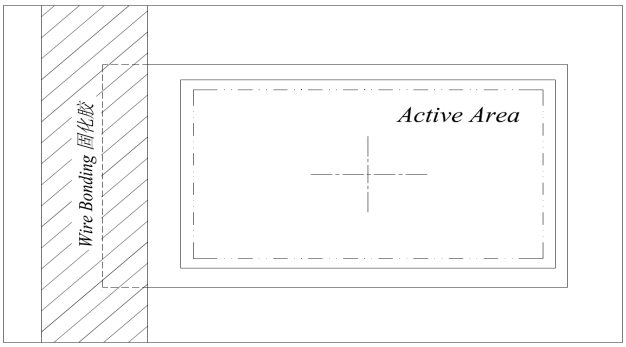


5. Pin Description

5.1 Pin Assignment



- **FPC module**



● **PCB module**

5.2 Pin description of FPC Module

PIN No. (FPC Side)	Symbol	Type	Description
1	GND	Power Supply	Circuit ground
2	OCP_OUT	Output	Over current protect flag
3	AVEE	Power Supply	Power supply for OLED cell, Connect a capacitor for stabilization
4	AVEE	Power Supply	Power supply for OLED cell, Connect a capacitor for stabilization
5	AVDD	Power Supply	Power supply for OLED cell, Connect a capacitor for stabilization
6	AVDD	Power Supply	Power supply for OLED cell, Connect a capacitor for stabilization
7	GND	Power Supply	Circuit ground
8	ELVDD	Output	Power supply for OLED cell, Connect a capacitor for stabilization
9	ELVDD	Output	Power supply for OLED cell, Connect a capacitor for stabilization
10	GND	Power Supply	Circuit ground
11	VREF2	Output	VREF voltage, Connect a capacitor for stabilization
12	VREF3	Output	VREF voltage, Connect a capacitor for stabilization
13	VGMP	Output	Gamma top voltage, Connect a capacitor for stabilization
14	VGSP	Output	Gamma bottom voltage, Connect a capacitor for stabilization
15	VREF1	Output	VREF voltage, Connect a capacitor for stabilization
16	GND	Power Supply	Circuit ground
17	VDD	Output	Internal system power, Connect a capacitor for stabilization
18	VDD	Output	Internal system power, Connect a capacitor for stabilization
19	VDDI	Power Supply	External power supply (1.8V for digital system power)
20	VDDI	Power Supply	External power supply (1.8V for digital system power)
21	VCOM	Output	Power supply for OLED cell, Connect a capacitor for stabilization
22	VCOM	Output	Power supply for OLED cell, Connect a capacitor for stabilization
23	GND	Power Supply	Circuit ground
24	TEST PIN 1	Input	TEST pin (no connect , floating)

<table>
<tr><td>25</td><td>TEST PIN 2</td><td>Input</td><td>TEST pin , connect to GND</td></tr>
<tr><td>26</td><td>SDA</td><td>Input/Output</td><td>Bi-direction data pin in I2C I/F
If this pin is not used, please connect to VDDI</td></tr>
<tr><td>27</td><td>SCL_WRX</td><td>Input</td><td>Synchronous clock signal in I2C IF.
If this pin is not used, please connect to VDDI</td></tr>
<tr><td>28</td><td>TEST PIN 3</td><td>Input/Output</td><td>TEST pin , (no connect , floating)</td></tr>
<tr><td>29</td><td>IM [0]</td><td>Input</td><td>Use to select the Interface type.
<table>
<tr><th>IM [0]</th><th>Command Execute</th><th>Image Write</th></tr>
<tr><td>0</td><td>MIPI</td><td>MIPI</td></tr>
<tr><td>1</td><td>I2C</td><td>MIPI</td></tr>
</table>
Note: MIPI 1port or 2port is selected by register setting</td></tr>
<tr><td>30</td><td>RESX</td><td>Input</td><td>This signal will reset the device and must be applied to properly initialize the chip, signal is active low</td></tr>
<tr><td>31</td><td>MVDDL</td><td>Output</td><td>Internal system power, Connect a capacitor for stabilization</td></tr>
<tr><td>32</td><td>MVDDA</td><td>Output</td><td>Internal system power, Connect a capacitor for stabilization</td></tr>
<tr><td>33</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>34</td><td>DATAP2</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>35</td><td>DATAN2</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>36</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>37</td><td>DATAP1</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>38</td><td>DATAN1</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>39</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>40</td><td>CLKP</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>41</td><td>CLKN</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>42</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>43</td><td>DATAP0</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>44</td><td>DATAN0</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>45</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>46</td><td>DATAP3</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>47</td><td>DATAN3</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>48</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
</table>

5.3 Pin description of PCB Module

<table>
<tr><th>PIN No.
(FPC Side)</th><th>Symbol</th><th>Type</th><th>Description</th></tr>
<tr><td>1</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>2</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>3</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>4</td><td>OCP_OUT</td><td>Output</td><td>Over current protect flag</td></tr>
<tr><td>5</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>6</td><td>GND</td><td>Input</td><td>Circuit ground</td></tr>
<tr><td>7</td><td>DATAP2</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>8</td><td>DATAN2</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>9</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>10</td><td>DATAP1</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>11</td><td>DATAN1</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>12</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>13</td><td>CLKP</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>14</td><td>CLKN</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>15</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>16</td><td>DATAP0</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>17</td><td>DATAN0</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>18</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>19</td><td>DATAP3</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>20</td><td>DATAN3</td><td>Input</td><td>Differential small amplitude signal of MIPI data input</td></tr>
<tr><td>21</td><td>GND</td><td>Input</td><td>Circuit ground for MIPI</td></tr>
<tr><td>22</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>23</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>24</td><td>TEST PIN 1</td><td>Input</td><td>TEST pin (no connect , floating)</td></tr>
<tr><td>25</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>26</td><td>GND</td><td>Power Supply</td><td>Circuit ground</td></tr>
<tr><td>27</td><td>TEST PIN 2</td><td>Input</td><td>TEST pin , connect to GND</td></tr>
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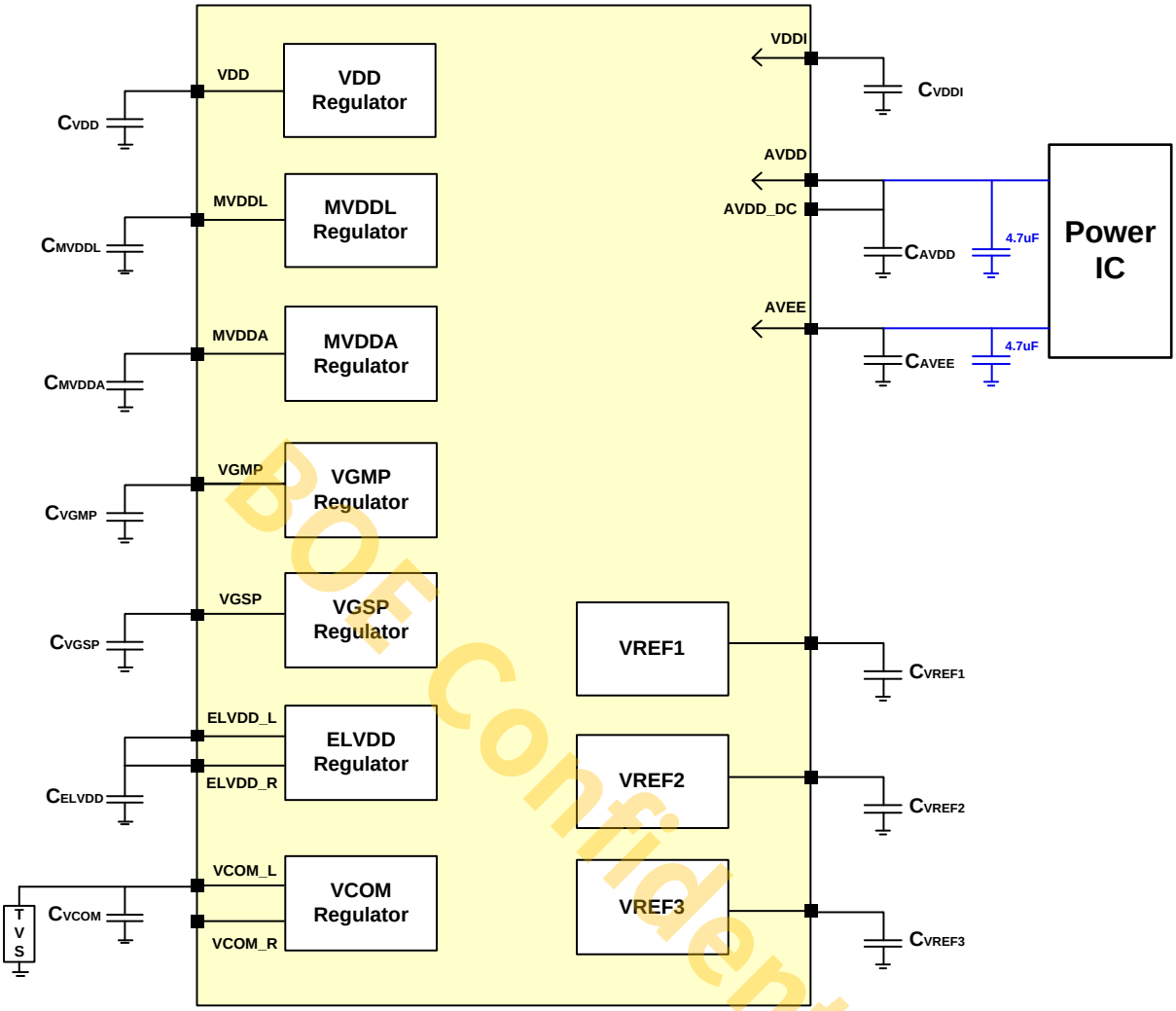
32	RESX	Input	This signal will reset the device and must be applied to properly initialize the chip, signal is active low
33	TEST PIN 3	Input	TEST pin (no connect , floating)
34	TEST PIN 4	Input	TEST pin (no connect , floating)
35	GND	Power Supply	Circuit ground
36	GND	Power Supply	Circuit ground
37	GND	Power Supply	Circuit ground
38	GND	Power Supply	Circuit ground
39	GND	Power Supply	Circuit ground
40	GND	Power Supply	Circuit ground
41	GND	Power Supply	Circuit ground
42	GND	Power Supply	Circuit ground
43	VDDI	Power Supply	External power supply (1.8V for digital system power)
44	VDDI	Power Supply	External power supply (1.8V for digital system power)
45	VDDI	Power Supply	External power supply (1.8V for digital system power)
46	VIN	Power Supply	External power supply
47	VIN	Power Supply	External power supply
48	VIN	Power Supply	External power supply
49	VIN	Power Supply	External power supply
50	GND	Power Supply	Circuit ground

5.4 Peripheral Circuit

Mounting the capacitor for each power supply to ensure that the panel display normally.



Notes:

Signal Name	Typical Value	Maximum Rated Voltage	Connection
VDDI	Cap, 2.2uF	6.3V	VDDI — GND
AVDD AVDD_DC	Cap, 1.0uF	10V	AVDD, AVDD_DC — GND
ELVDD_L ELVDD_R	Cap, 2.2uF	10V	ELVDD_L, ELVDD_R — GND
AVEE	Cap, 1uF	10V	AVEE — GND
VDD	Cap, 4.7uF	6.3V	VDD — GND
MVDDA	Cap, 1uF	6.3V	MVDDA — GND
MVDDL	Cap, 1uF	6.3V	MVDDL — GND
VGMP	Cap, 1uF	10V	VGMP — GND
VGSP	Cap, 1uF	10V	VGSP — GND
VREF1	Cap, 1uF	6.3V	VREF1 — GND
VREF2	Cap, 1uF	6.3V	VREF2 — GND
VREF3	Cap, 1uF	6.3V	VREF3 — GND
VCOM_L VCOM_R	Cap, 2.2uF TVS	10V	VCOM_L — GND VCOM_R — GND

(1) There are totally 13 capacitors and 1 TVS.

(2) The TVS is placed between VCOM and ground.

6. Absolute Maximum Ratings

Item	Symbol	Min.	Maximum Ratings	Unit
External power supply	VDDI	1.65	1.95	V
	Vin (for PCB)	2.7	5.5	V
OLED Power Supply	AVDD	5.0	6.5	V
	AVEE	-5.0	-6.5	V
Logic input voltage	Vi	1.65	1.95	V
Operating temperature	Topr	-40	85	°C
Storage temperature	Tstg	-55	125	°C

7. Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max	Unit
External power supply	VDDI	1.65	1.8	1.95	V
	Vin (for PCB)	2.7	3.3	5.5	V
OLED Power Supply	AVDD	5.0	5.4	6.5	V
	AVEE	-5.0	-5.4	-6.5	V
Logic input voltage	Vi	1.65	1.8	1.95	V
Operating temperature	Topr	-10		80	°C

8. Electrical Characteristics

8.1 DC Characteristics

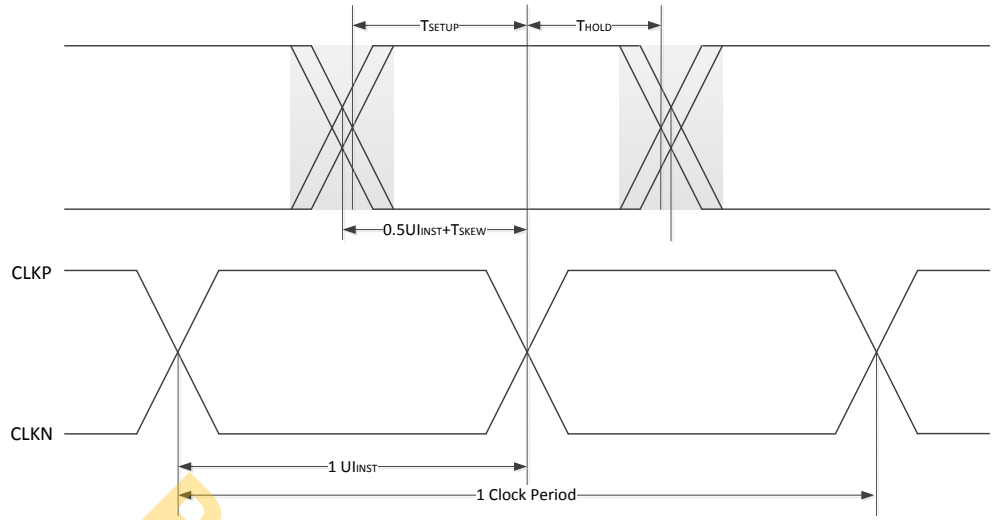
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Power & Operation Voltage						
AVDD Input Level	AVDD	-	5.0		6.5	V
AVEE Input Level	AVEE	-	-5.0		-6.5	V
Digital I/O Power Supply	VDDI	-		1.8		V
Digital I/O Input Level @Logic High	VIH	VDDI=1.65V ~ 1.95V	0.7*VDDI	-	VDDI	V
Digital I/O Input Level @Logic Low	VIL	VDDI=1.65V ~ 1.95V	0	-	0.3*VDDI	V
Power IC Input Level	VIN (for PCB)	Vin = 2.5V~5.5V	2.5	4.4	5.5	V

8.2 AC Characteristics

8.2.1 MIPI High Speed Mode Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
UI instantaneous	UIINST	1	-	3	ns
T Data to Clock Skew	TSKEW	-0.15	-	0.15	UIHS

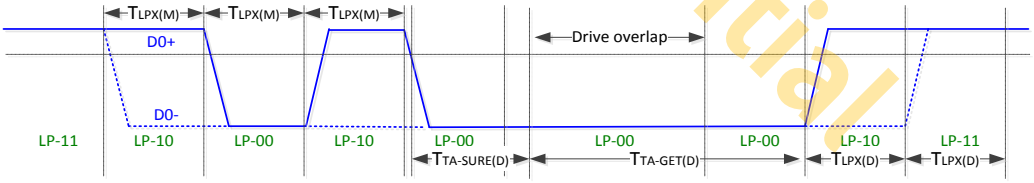
RX Data to Clock Setup Time Tolerance	TSETUP	0.15	-	-	UIHS
RX Data to Clock Hold Time Tolerance	THOLD	0.15	-	-	UIHS



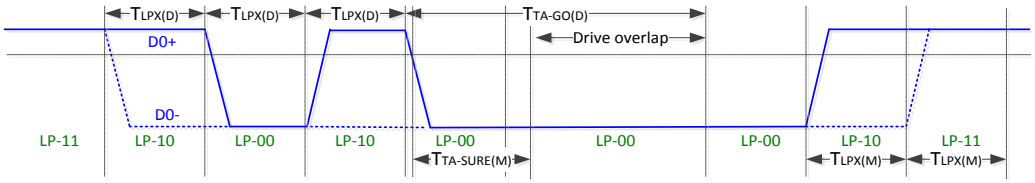
8.2.2 MIPI Low Power Mode Characteristics

Parameter	Description	Min	Typ.	Max	Unit
$T_{LPX(M)}$	Transmitted length of any Low-Power state period (MCU to display module)	50	-	-	ns
$T_{LPX(D)}$	Transmitted length of any Low-Power state period (display module to MCU)	50	-	-	ns
$T_{TA-SURE}$	Time that the new transmitter waits after the LP-10 state before transmitting the Bridge state(LP-00) during a Link Turnaround	T_{LPX}	-	$2*T_{LPX}$	
T_{TA-GET}	Time that the new transmitter drives the Bridge state(LP-00) after accepting control during a Link Turnaround	$5*T_{LPX}$			
T_{TA-GO}	Time that the transmitter drives the Bridge state(LP-00) before releasing control during a Link Turnaround	$4*T_{LPX}$			

- Bus Turnaround from MPU to display module



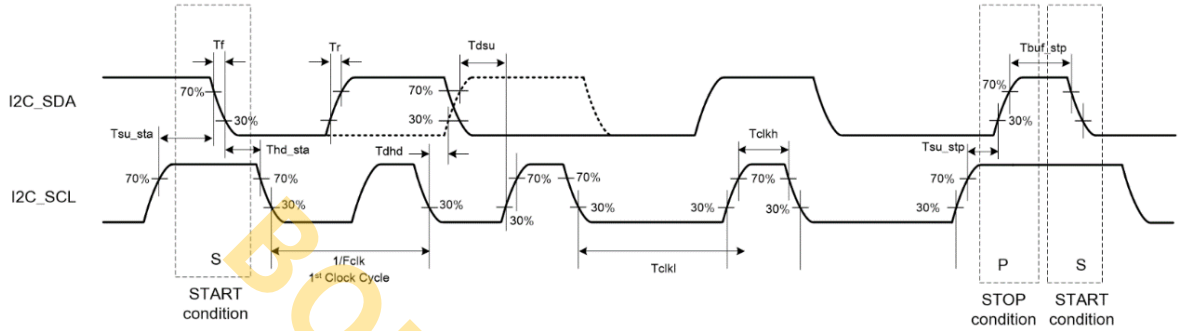
- Bus Turnaround from display module to MPU



8.2.3 I2C Interface Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
I2C Clock Frequency	Fclk	-	-	400	kHz
I2C Clock Low	Tclkl	1300	-	-	ns
I2C Clock High	Tclkh	600	-	-	ns

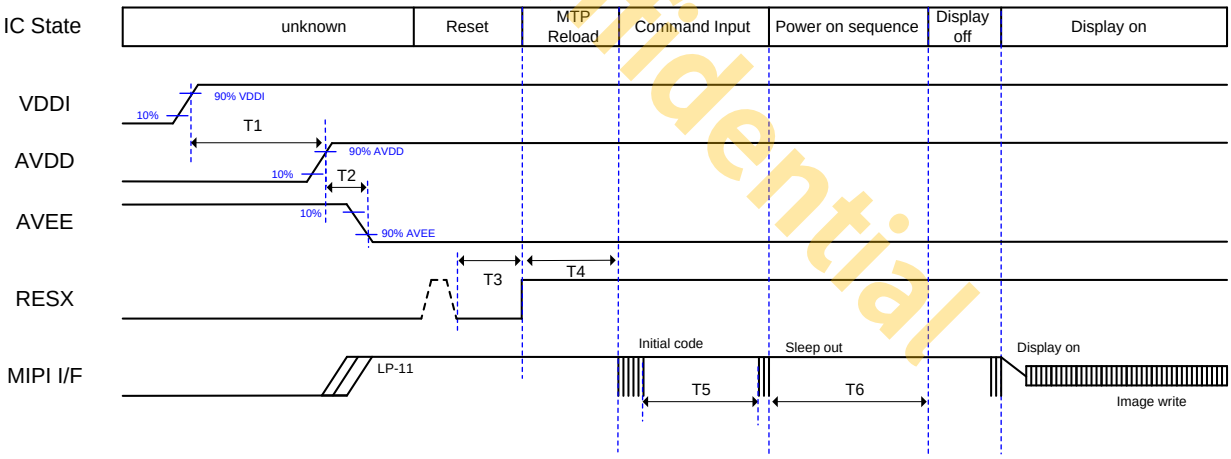
I2C Data Rising Time	Tdr	-	-	300	ns
I2C Data Falling Time	Tdf	-	-	300	ns
I2C Data Setup Time	Tdsu	100	-	-	ns
I2C Data Hold Time	Tdhd	-	-	TBD	ns
I2C Setup Time (Start Condition)	Tsu_sta	600	-	-	ns
I2C Hold Time (Start Condition)	Thd_sta	600	-	-	ns
I2C Setup Time (Stop Condition)	Tsu_stp	600	-	-	ns
I2C Bus Free Time (Stop Condition)	Tbuf_stp	1300	-	-	ns



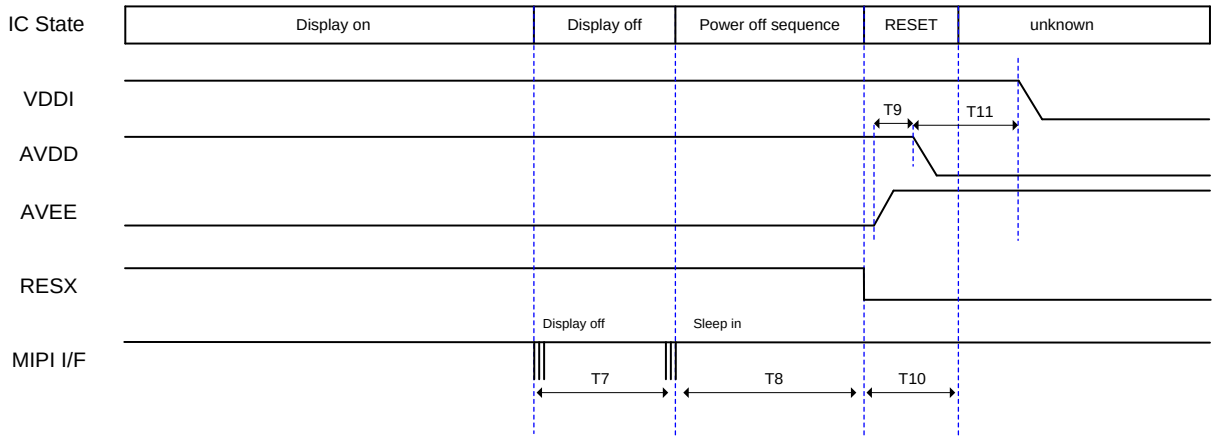
9. Power Supply Sequence

9.1 Power On/Off Sequence

Power on sequence



Power off sequence



Symbol	Min.	Typ.	Max.	Unit	Description
T1	1	-	-	ms	Power on time between AVDD and VDDI
T2	1	-	-	ms	Power on time between AVDD and AVEE
T3	1	-	-	ms	Effective hardware reset period
T4	20	-	-	ms	MTP reload time
T5	0	-	-	ms	The time is between initial code finished and sleep-out command
T6	2	-	8	VS	Power on sequence, the period can be modified
T7	1	-	-	VS	Blanking region
T8	-	1	-	VS	Power off sequence, the period can be modified
T9	1	-	-	ms	Power off time between AVEE and AVDD
T10	1	-	-	ms	Effective hardware reset period
T11	1	-	-	ms	Power off time between AVEE and VDDI

10. Description of Function

10.1 Display Mode

10.1.1 Power Mode

ITEM	Code value
Sleep In	0x10
Sleep Out	0x11
Display On	0x29
Display Off	0x28

10.1.2 Idle Mode

ITEM	Code value
Idle On	0x39
Idle Off	0x38

10.1.3 BIST Mode

Register setting：

◆ BIST On/Off Control (C4h)

<table>
<tr><td rowspan="2">Instruction</td><td rowspan="2">R/W</td><td colspan="2">Address name</td><td colspan="9">Parameter</td></tr>
<tr><td>MIPI</td><td>Other</td><td>D15-D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
<tr><td rowspan="4">BISTONOFF</td><td rowspan="4">R/W</td><td rowspan="4">C4h</td><td>C400h</td><td>-</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>C401h</td><td>-</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>C402h</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>BION1</td></tr>
<tr><td>C403h</td><td>-</td><td>BION2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Description</td><td colspan="11">This command is used to control BIST function (Free Run mode).
BIST function enable step:
1. Enter Sleep-In(10h) mode.
2. Setting PATENICYC[1:0] and BISTPATEN[11:0] to control the display cycle time and pattern.
3. Setting BION1=”1” and BION2=”1”, the driver IC will start to run the BIST function.
BIST function disable step:
1. Setting BION1=”0” and BION2=”0”,the driver IC will return to normal function.
2. Sending MIPI video data and enter Sleep-Out(11h) mode for normal display.</td></tr>
<tr><td>Restriction</td><td colspan="11">-</td></tr>
<tr><td>Default</td><td colspan="11"><table><tr><td>Status</td><td colspan="2">Default Value</td></tr><tr><td rowspan="4">Power On Sequence</td><td>C400h</td><td>AAh</td></tr><tr><td>C401h</td><td>55h</td></tr><tr><td>C402h</td><td>00h</td></tr><tr><td>C403h</td><td>00h</td></tr></table></td></tr>
</table>

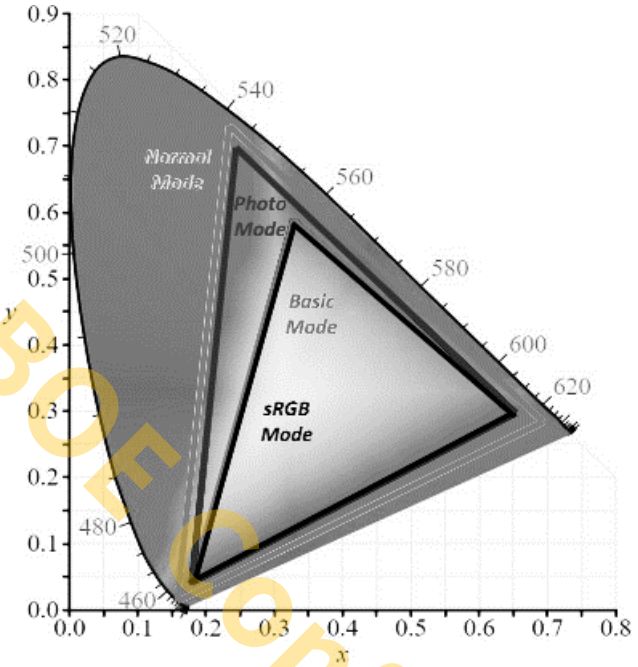
◆ BIST CTRL (C5h)

<table>
<tr><td rowspan="2">Instruction</td><td rowspan="2">R/W</td><td colspan="2">Address name</td><td colspan="9">Parameter</td></tr>
<tr><td>MIPI</td><td>I2C</td><td>D15-D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
<tr><td rowspan="3">BISTSET</td><td rowspan="3">R/W</td><td rowspan="3">C5h</td><td>C500h</td><td>-</td><td>0</td><td>0</td><td colspan="2">PATENICYC[1:0]</td><td colspan="4">BISTPATEN[11:8]</td></tr>
<tr><td>C501h</td><td>-</td><td colspan="8">BISTPATEN[7:0]</td></tr>
<tr><td>C502h</td><td>-</td><td colspan="8">GRAY_LEVEL[7:0]</td></tr>
<tr><td>escription</td><td colspan="11">
This command is used to set the display pattern in BIST function.
PATENICYC[1:0] : Cycle time between each display pattern.
<table>
<tr><td>PATENICYC[1:0]</td><td>Pattern cycle time</td></tr>
<tr><td>0h</td><td>256 Frame</td></tr>
<tr><td>1h</td><td>512 Frame</td></tr>
<tr><td>2h</td><td>1024 Frame</td></tr>
<tr><td>3h</td><td>2048 Frame</td></tr>
</table>
BISTPATEN[11:0] : Select the display pattern in BIST function.
<table>
<tr><td>BISTPATEN[9:0]</td><td>Description</td></tr>
<tr><td>BISTPATEN[0]</td><td>Red pattern.</td></tr>
<tr><td>BISTPATEN[1]</td><td>Green pattern.</td></tr>
<tr><td>BISTPATEN[2]</td><td>Blue pattern.</td></tr>
<tr><td>BISTPATEN[3]</td><td>Black pattern.</td></tr>
<tr><td>BISTPATEN[4]</td><td>Gray Level pattern. (Set by BIST_GRAY_LEVEL[7:0])</td></tr>
<tr><td>BISTPATEN[5]</td><td>Vertical Gradation pattern.</td></tr>
<tr><td>BISTPATEN[6]</td><td>Horizontal Gradation pattern.</td></tr>
<tr><td>BISTPATEN[7]</td><td>Color Bar pattern.</td></tr>
<tr><td>BISTPATEN[8]</td><td>Crosstalk with boundary pattern.</td></tr>
</table>
Note1: the patterns which the bit number of BISTPATEN[9:0] is set to “1” will display and change automatically.
Note2: When BISTPATEN[11:0]=12’h000, display pattern will be black pattern.
GRAY_LEVEL[7:0] : Set the gray level when BISTPATEN[4]=”1” in BIST function.
<table>
<tr><td>GRAY_LEVEL[7:0]</td><td>Description</td></tr>
<tr><td>0h</td><td>Gray Level : 00h</td></tr>
<tr><td>1h</td><td>Gray Level : 01h</td></tr>
<tr><td>2h</td><td>Gray Level : 02h</td></tr>
<tr><td>:</td><td>:</td></tr>
<tr><td>FDh</td><td>Gray Level : FDh</td></tr>
<tr><td>FEh</td><td>Gray Level : FEh</td></tr>
<tr><td>FFh</td><td>Gray Level : FFh</td></tr>
</table>
</td></tr>
<tr><td>Restriction</td><td colspan="11">-</td></tr>
<tr><td>Default</td><td colspan="11">
<table>
<tr><td>Status</td><td colspan="2">Default Value</td></tr>
<tr><td rowspan="3">Power On Sequence</td><td>C500h</td><td>01h</td></tr>
<tr><td>C501h</td><td>FFh</td></tr>
<tr><td>C502h</td><td>FFh</td></tr>
</table>
</td></tr>
</table>

10.2 Image Enhancement

10.2.1 Gamut Mapping—Selectable Color Mode with Different Gamut

◆ 0.71” Micro OLED support Normal Mode/Photo Mode/ Basic Mode (sRGB Mode).



◆ Register Setting

Gamut mapping (57 CMD1).

5700H	GAMUT										
Instruction	R/W	Address name		Parameter							
		MIPI	I2C	D15-D8	D7	D6	D5	D4	D3	D2	D1	D0
GAMUT	R/W	57h	5700h	-	-	-	-	-	-	-	GAMUT_SEL [1:0]	
Description	This command sets the control of gamut mapping.											

Bit	Symbol	Description	Comment
2bit	GAMUT_SEL[1:0]	Gamut mapping control	0h= Gamut mapping 0 —Normal Mode 1h= Gamut mapping 1—Photo Mode 2h= Gamut mapping 2—Basic Mode

Restriction	-

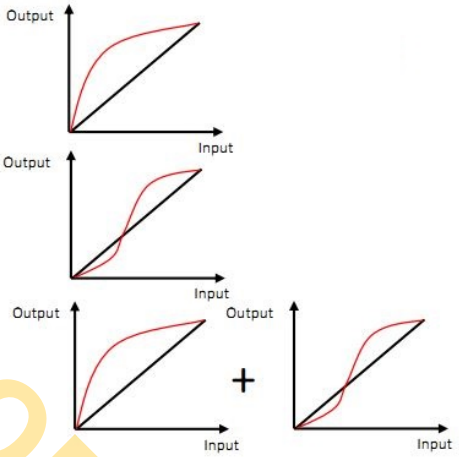
Default	Status	Default Value	
	Power On Sequence	5700h	00h

10.2.2 Contrast/Edge Enhancement

Contrast Enhancement：

◆ Adaptive curve for indoor and outdoor environment

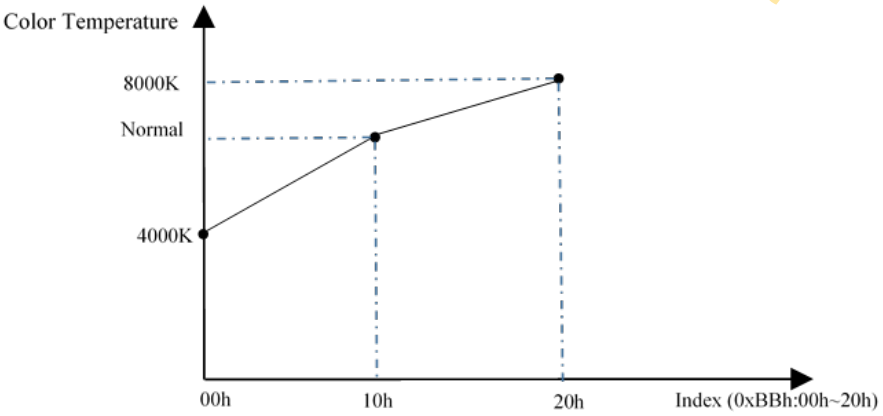
In order to increase the readable, we need trade-off between brightness and contrast ratio.



Adaptive curve of contrast

10.3 Color Temperature Function (Auto White Balance Control)

This function adjusts the R/G/B gamma parameter according to the register BBh setting to adjust the White balance and change the color temperature at the same time.

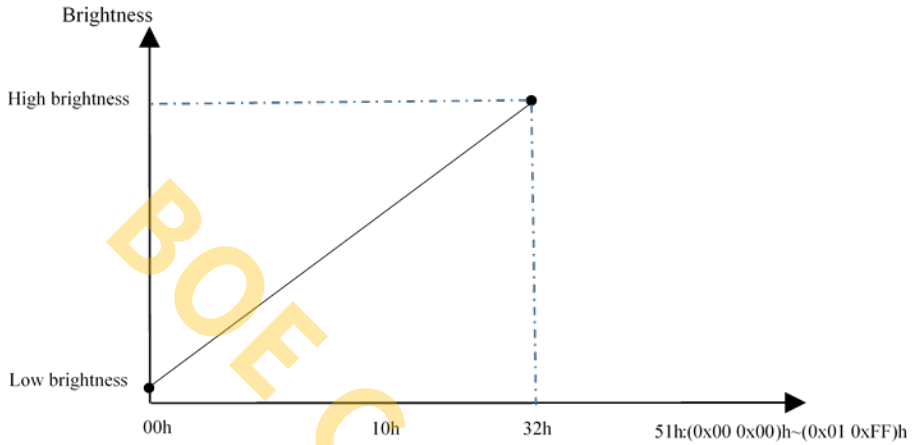


◆ Register setting

ITEM	Address name	Code value	Default value
Color Temperature	0xBBh CMD Page1	00h~20h	10h

10.4 Brightness Control(BC) Functions

This function adjusts the gamma parameter according to the register 51h and 53h setting to adjust the luminance.



◆ Register setting

White Display Brightness(51h CMD1).

5100H	WRDISBV										
Instruction	R/W	Address		Parameter							
		MIPI	Other	D15-D8	D7	D6	D5	D4	D3	D2	D1	D0
WRDISBV	W	51h	5100h	-	DBV[7:0]							
			5101h	-	-	-	-	-	-	-	-	DBV [8]
Description	This command is used to adjust brightness.											
Restriction	-											
Default	Status			Default Value								
	Power On Sequence			5100h					00h			
				5101h					00h			

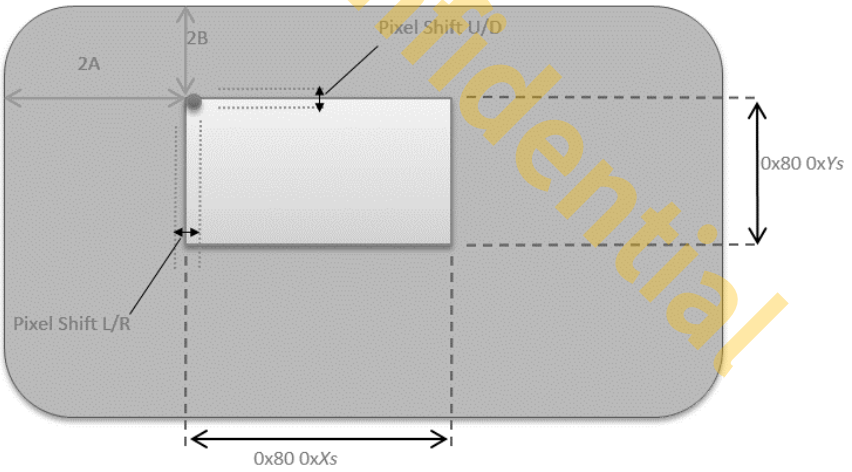
WRCTRLD (5300h): Write CTRL Display

5300H	WRCTRLD										
Instruction	R/W	Address		Parameter							
		MIPI	Other	D15-D8	D7	D6	D5	D4	D3	D2	D1	D0
WRCTRLD	W	53h	5300h	-	-	-	D5	-	D3	D2	-	-

<table>
<tr><td>Description</td><td>This command is used to set brightness control and display diming control.
<table>
<tr><th>Bit</th><th>Symbol</th><th>Description</th><th>Comment</th></tr>
<tr><td>D5</td><td>BCTRL</td><td>Brightness control</td><td>1= Brightness control enable
0= Brightness control disable</td></tr>
<tr><td>D3</td><td>DD_BC</td><td>Display dimming control</td><td>1= Display dimming control enable
0= Display dimming control disable</td></tr>
<tr><td>D2</td><td>DD_TC</td><td>Temperature index dimming control</td><td>1 = Temperature dimming control enable
0 = Temperature dimming control disable</td></tr>
</table></td></tr>
</table>

10.5 Display Active-Area(AA) Control

ITEM	Description	Code
Resolution	X-direction: Support 4M, N= 160~480 Y-direction: Support 4N, M = 120~270	CMD1：0x80(NC[8:0] NL[8:0])
Active-Area(AA) control	Display start pointer	Xs：CMD1：0x2A Ys：CMD1：0x2B
	Pixel shift：±12pixel/step=4pixel	CMD2 Page0：0xB4



11. Optical Characteristics

11.1 Optical Characteristics

Item			0.71' Micro OLED SPEC
White Brightness	Center		2000 cd/m²
White Uniformity 9 point	White (255)		>90%
	White (128)		>90%
	White (64)		>90%
View Angle (White)	Lum. Decay (50%)		-55°~55°
	Color Shift (Δu'v'<0.025)		-45°~45°
Contrast	CR		> 100000 : 1
Color Coordinate	Red	CIE-x	0.64±0.05
		CIE-y	0.33±0.05
	Green	CIE-x	0.26±0.05
		CIE-y	0.67±0.05
	Blue	CIE-x	0.15±0.05
		CIE-y	0.07±0.05
	White	CIE-x	0.31±0.05
		CIE-y	0.33±0.05
Color Gamut (NTSC)			>80%
Color Temperature			>6000K

11.2 Measurement System · Measurement Method

The luminance and chromaticity are measured in Measurement System A shown below.

Measurement temperature: Tpnl = 30°C

Measurement point: One point on the screen center

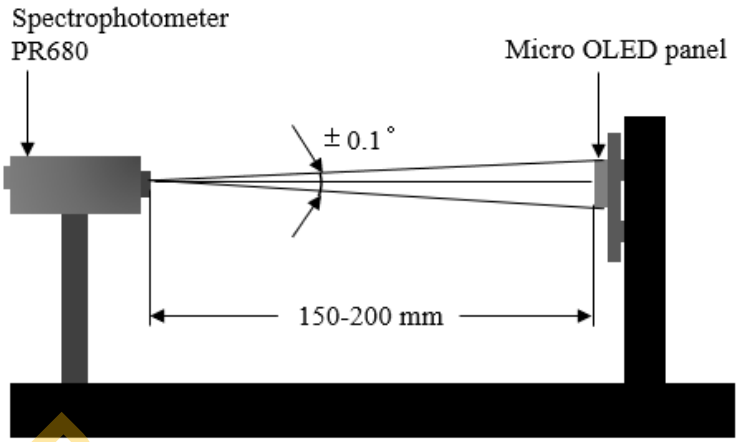
All white display: All RGB signal data is set to High.

All black display: All RGB signal data is set to Low.

Luminance and chromaticity: Measure the luminance and chromaticity in all white display in Measurement System A.

Contrast: Measure the luminance in all white display (@ : 2000cd/m^2) and all black display in Measurement System A, and substitute them into the formula below.

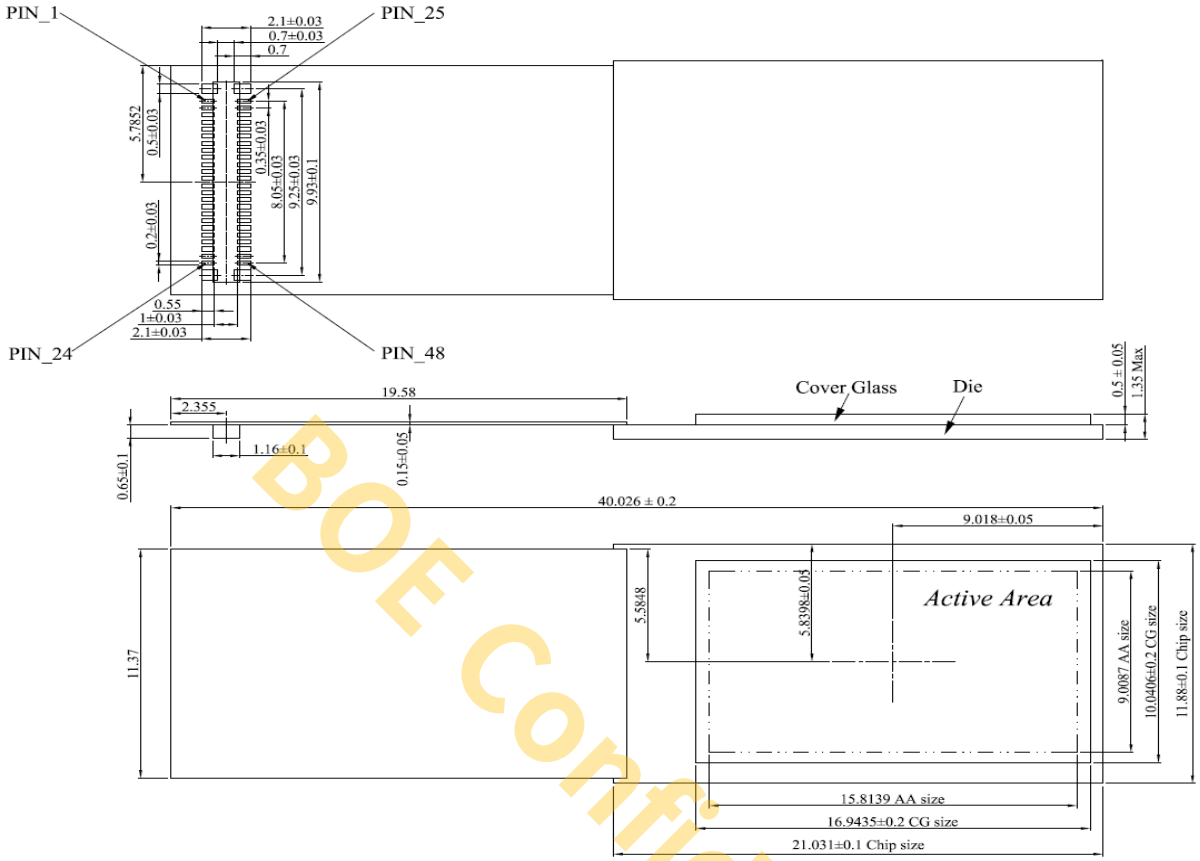
Contrast = Luminance in all white display/Luminance in all black display



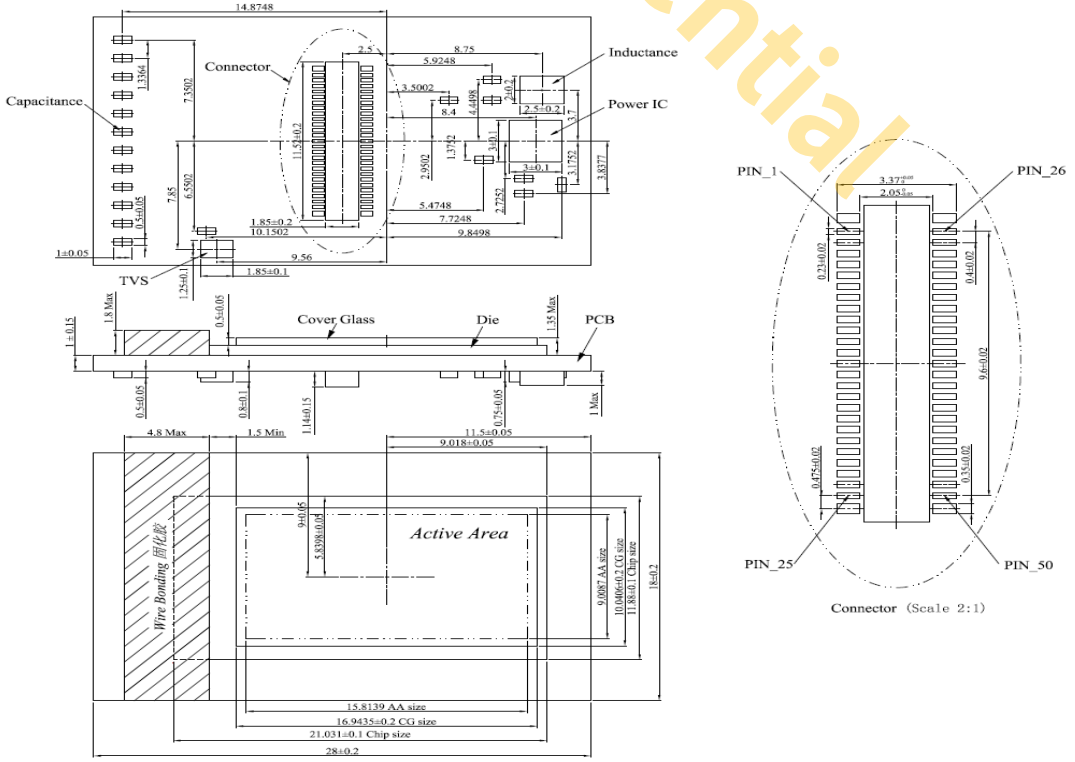
Measurement System

13. Package Outline

13.1 FPC Module(Unit：mm)



13.2 PCB Module(Unit：mm)



14. Notes on Handling

14.1 Static charge prevention

Be sure to take the following protective measures. Organic EL panels are easily damaged by static charges.

(1) Use non-chargeable gloves or handle with bare hands.

(2) Use a wrist strap connecting ground when handling.

(3) Do not touch any electrodes on the panel.

(4) Wear non-chargeable clothes and conductive shoes.

(5) Install grounded conductive mats on the working floor and working table.

(6) Keep the panel away from any charged materials.

14.2 Protection from dust and dirt

(7) Operate in a clean environment.

(8) Do not touch the panel surface. The surface is easily scratched.
When cleaning on panel surface, use a clean-room wiper with isopropyl alcohol. Be careful not to leave stains on the surface.

(9) Use ionized air to blow dust off the panel surface.

14.3 Others

(10) Not hold FPC (Flexible Printed Circuit) , not twist the FPC, not bend FPC because connection area between the FPC and panel is easily broken by mechanical stress.

(11) The minimum fold radius of the FPC is 1.0 mm, So, do not fold the FPC less than 1.0mm radius.

(12) Do not drop the module.

(13) Do not twist or bend the module .

(14) Keep the module away from heat sources.

(15) Not be close the module to water or other solvents.

(16) Do not store or use the module at high temperatures or high humidity circumstance, as the circumstance may affect module specifications.

(17) When disposing of this, regard it as industrial waste and please comply with related regulations.

(18) Do not store or use the panel in reactive chemical substance (including alcohol) environments, as these may affect the specifications.