宇华国际科技有限公司

YuHua INT,L Technology Co., LIMITED

SPECIFICATION FOR LCD MODULE

Customer : _____

Product Model: G080SD60A2

Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

☐ **LCM Machinery OK** Checked By _____ ☐ **LCM Display OK** Checked By _____	☐ **LCM OK** ☐ **NG，Problem survey:** Approved By _____

※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

宇华国际科技有限公司
YuHua INT,L Technology Co., LIMITED

Record of Revision

Version	Revise Date	Page	Content
Pre-Spec.01	2016/11/23		Initial Release.

宇华国际科技有限公司
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1 General Specifications

No.	Item	Specification	Remark
1	LCD size	8.0 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800 X 3(RGB) X 480	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.0736(W) X 0.2070(H) mm	
6	Active area	176.64(W) X 99.36(H) mm	
7	Module size	192.8(W) X 116.9(H) X 6.4(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	Digital	
11	Backlight	White LED*30CHIP	PCS
12	Panel Power consumption	TBD	
13	Weight	TBD	

Note 1: Refer to Mechanical Drawing.

2 Pin Assignment

FPC I/O PIN ASSIGNMENT

Pin	Name	I/O	Description
1	GND	I	Power Ground
2	VGL	I	Gate OFF Power Supply Voltage
3	VGL	I	Gate OFF Power Supply Voltage
4	/XAO	I	Output all-on control When /XAO is set to L, all outputs are fixed to VGH
5	VDDG	I	Gate Driver Power supply (+3.3V)
6	VDDG	I	Gate Driver Power supply (+3.3V)
7	GND	I	Power Ground
8	VGH	I	Gate ON Power Supply Voltage
9	UD	I	Gate Driver Up/down scan setting When UD=H, reverse scan When UD=L, normal scan (Default pull low)
10	DE	I	Input data enable control When DE mode, active High to enable data input. (Default pull low)
11	FRC	I	Dithering control setting When FRC=H, the width of data input 8 bits When FRC=L, the width of data input 6 bits and set Dx0 and Dx1 to logical low (Default pull low)
12	B07	I	Blue data (MSB)
13	B06	I	Blue data
14	B05	I	Blue data
15	B04	I	Blue data
16	B03	I	Blue data
17	B02	I	Blue data
18	B01	I	Blue data
19	B00	I	Blue data (LSB)
20	CLK	I	Clock signal User can input different polarity CLK by EDGSL setting. (Default pull low)
21	GND	I	Power Ground
22	G07	I	Green data (MSB)
23	G06	I	Green data
24	G05	I	Green data
25	G04	I	Green data
26	G03	I	Green data
27	G02	I	Green data
28	G01	I	Green data
29	G00	I	Green data (LSB)
30	R07	I	Red data (MSB)
31	R06	I	Red data
32	R05	I	Red data
33	R04	I	Red data
34	R03	I	Red data
35	R02	I	Red data

36	R01	I	Red data
37	R00	I	Red data (LSB)
38	RESETB	I	Hardware global reset. Low active (Default pull high)
39	EDGSL	I	Define input clock polarity When EDGSL=L, Latch data by rising edge of CLK (Default Pull Low) When EDGSL=H, CLK polarity is inverted, Latch data by falling edge of CLK
40	LR	I	Shift direction of Source Driver IC internal shift register is controlled by this pin as show below: LR=H SO1→ ……SO1200 (Default pull high) LR=L SO1200→…….SO1
41	GND	I	Power Ground
42	VCOM	I	Common voltage input
43	VCOM	I	Common voltage input
44	VCOM_Cst	I	Power Ground
45	VCC	I	Digital power supply (+3.3V)
46	VCC	I	Digital power supply (+3.3V)
47	AVDD	I	Analog power supply
48	AVDD	I	Analog power supply
49	GM1	I	Gamma voltage level 1 /NC
50	GM2	I	Gamma voltage level 2 /NC
51	GM3	I	Gamma voltage level 3/NC
52	GM4	I	Gamma voltage level 4/NC
53	GM5	I	Gamma voltage level 5/NC
54	GM6	I	Gamma voltage level 6/NC
55	GM7	I	Gamma voltage level 7/NC
56	GM8	I	Gamma voltage level 8/NC
57	GM9	I	Gamma voltage level 9/NC
58	GM10	I	Gamma voltage level 10/NC
59	VSSA	I	Power Ground
60	GND	I	Power Ground

Note (1) User's connector Part No: 089K60-000000-G2(60) (STARCON)

5.2 BACKLIGHT DRIVING SECTION

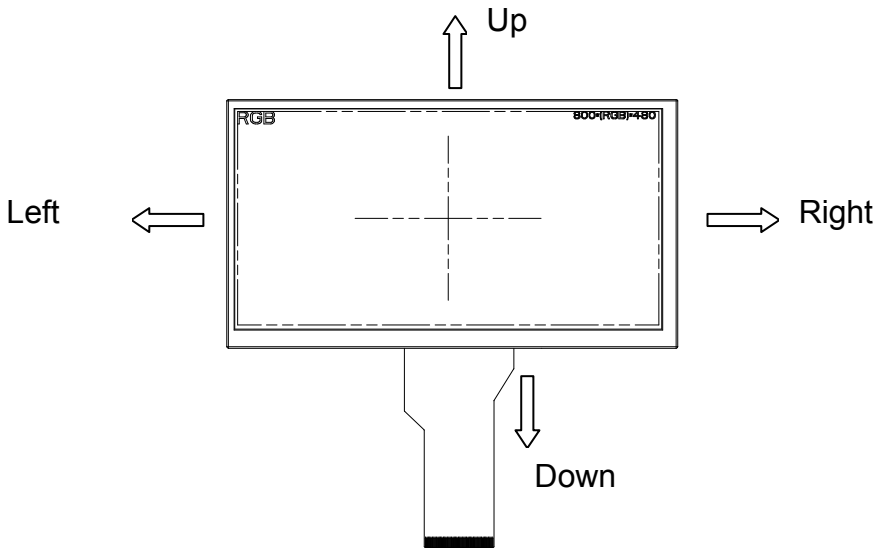
No	Symbol	I/O	Description
1	Hi	I	Power supply for backlight unit (High voltage)
2	GND	-	Ground for backlight unit

Note (1) User's connector Part No: Aces 87210_02X6X

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV_{DD}	Up to down, left to right
DV_{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV_{DD}	DV_{DD}	Down to up, left to right

Note 5: Definition of scanning direction.
Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB="1",Disable internal dithering function,
When DITHB="0",Enable internal dithering function,

3 Operation Specifications

3.1 Absolute Maximum Rating

(GND=AV_{SS}=0V, Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{CC}	-0.3	5.0	V	
	AV_{DD}	6.5	13.5	V	
	V_{GH}	-0.3	40.0	V	
	V_{GL}	-20.0	0.3	V	
	V_{GH}-V_{GL}	-	40.0	V	
Operation Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	
LED Reverse Voltage	Vr	-	1.2	V	Each LED Note 2
LED Forward Current	I_f	-	25	mA	Each LED

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 2: V_R Conditions: Zener Diode 20mA

3.1.1 Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	(10.2)	(10.4)	(10.6)	V	
	V_{GH}	(15.3)	(16.0)	(16.7)	V	
	V_{GL}	(-7.7)	(-7.0)	(-6.3)	V	
Input signal voltage	V_{COM}	3.4	3.7	4.0	V	
Input logic high voltage	V_{IH}	0.7 DV_{DD}	-	DV_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	-	0.3 DV_{DD}	V	

Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH}
Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.
Note 3: DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.

3.1.2 Current Consumption

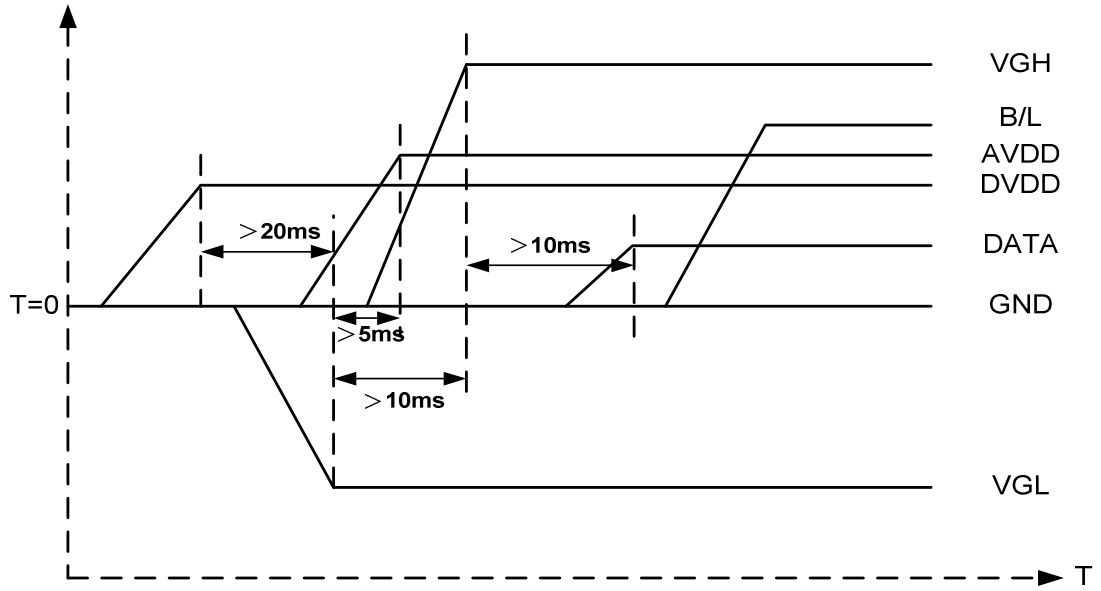
Item	Symbol	Unit	Test Condition	Min	Typ.	Max	Note
Gate on power current	IVGH	mA	VGH=16V	-	0.2	1.0	-
Gate off power current	IVGL	mA	VGL=-7.0V	-	0.2	1.0	-
Analog power current	IVDD	mA	VDD=3.3V	-	4.0	10	-
Analog power current	IAVDD	mA	AVDD=10.4V	-	20	50	

3.1.3 Backlight Driving Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VF	Only Backlight	9	9.9	10.5	V
Supply Current	IF		200			mA
LED life time	-	-	20000	--	--	Hr
CIE Color Coordinate	X	Backlight Current	0.25	-	0.315	-
	Y		0.25	-	0.315	
Uniformity	B	Backlight Current	80	-	-	(%)
Color	White					

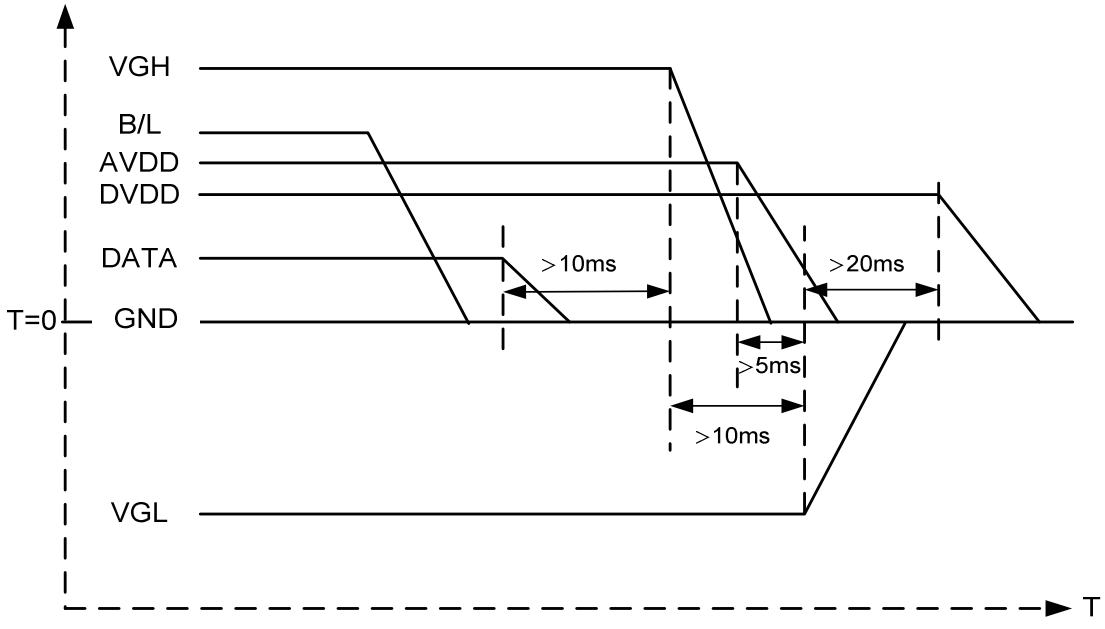
3.2 Power Sequence

3.2.1 Power on:



DV_{DD}→VGL→VGH→Data→B/L

3.2.2 Power off:



B/L→Data→VGH→VGL→DV_{DD}

Note: Data include R0~R7, B0~B7, GO~G7, U/D, L/R, DCLK, HS, VS, DE.

3.3 Timing Characteristics

3.3.1 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	-	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

3.3.2 Data Input Format

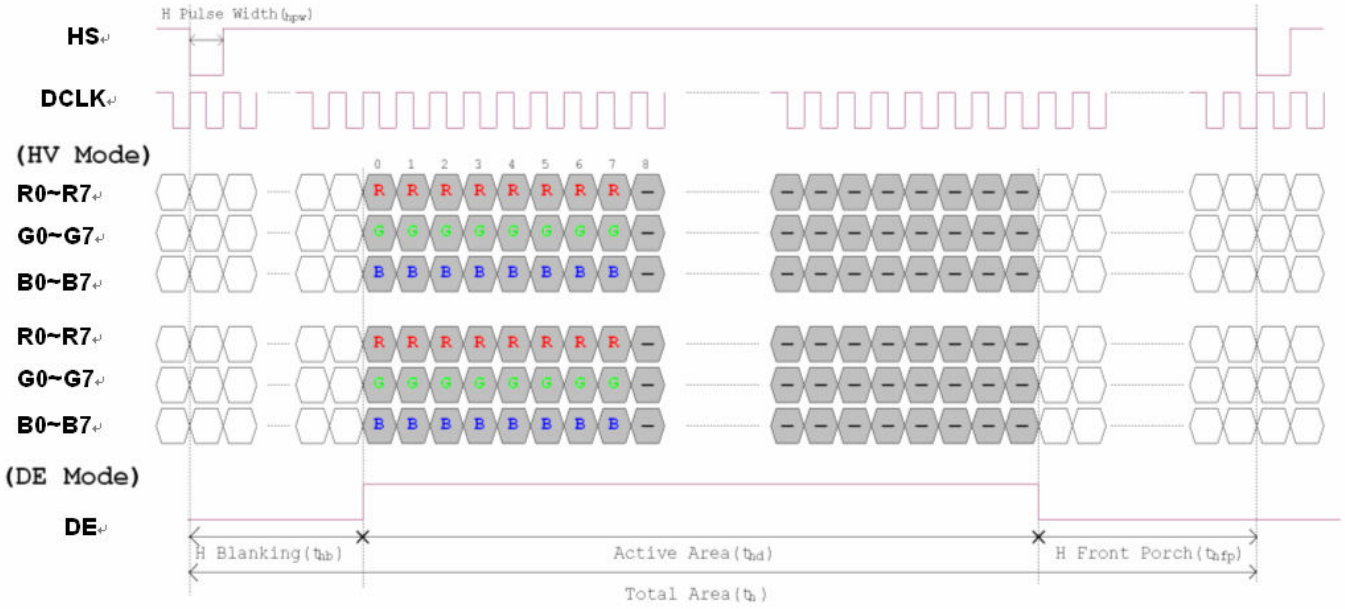


Figure 3. 1 Horizontal input timing diagram.

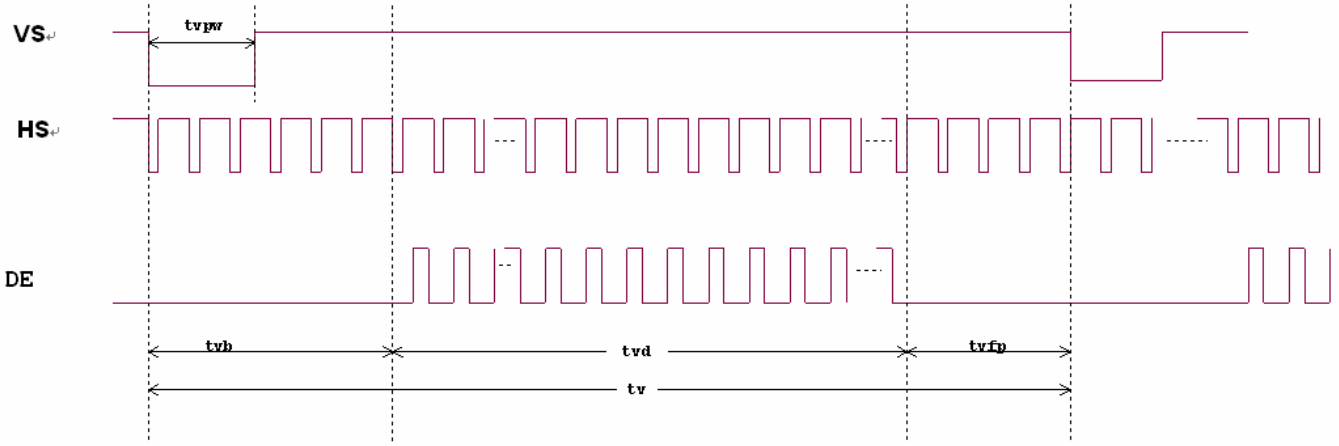


Figure 3. 2 Vertical input timing diagram.

3.3.3 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

4 Optical Specifications

Item of electro-optical characteristics	Symbol		Condition	Min	Typ	Max	Unit	Remark
Contrast ratio	CR		Ø =0°		500	--		Note1
Surface Luminance	YL		200mA	500	600	--	Cd/ M^2	Note1
Color saturation	NTSC		-	--	50	--	%	
Response time	Ton		Ø =0°	--	10	20	ms	Note2
	Tof			--	15	30		
Viewing angle range	Ø =0°		Top	40	50	--		Note3
			Bottom	60	70	--		
			Left	60	70	--		
			Right	60	70	--		
Module Chromaticity CIE(x,y)	White	x	Ø =0°		0.310			Note4
		y			0.330			
	Red	x		--	0.587	--		
		y		--	0.331	--		
	Green	x		--	0.344	--		
		y		--	0.571	--		
	Blue	x		--	0.146	--		
		y		--	0.092	--		
Transmittance	Trans		--	5.39	5.89	--	%	Note5
Cross talk	Ct		--	--	--	2	%	Note6

Notes(1) :1. All input terminals LCD panel must be ground while measuring the center area of the panel.

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state.
(see Figure 4) Luminance Contrast Ratio (CR) is defined mathematically

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note (2) Definition of Response Time (TR, TF):

Note 1: Definition of viewing angle range

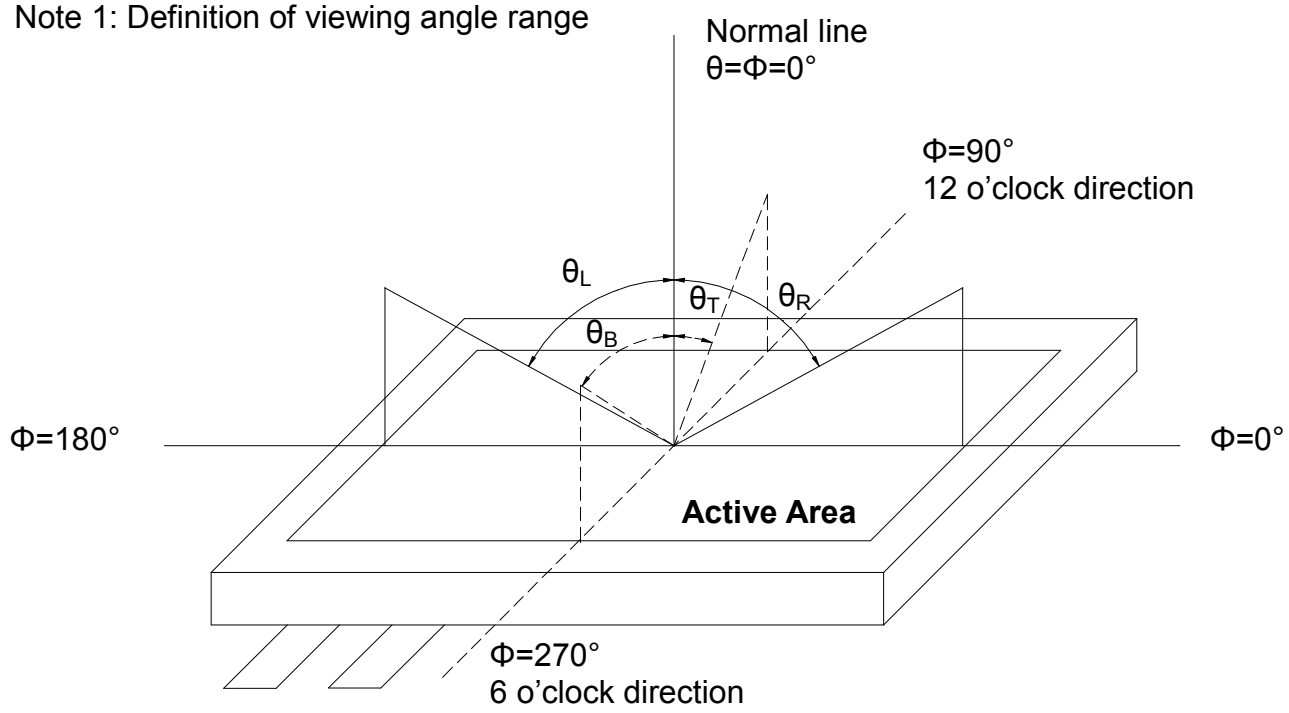


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. The optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

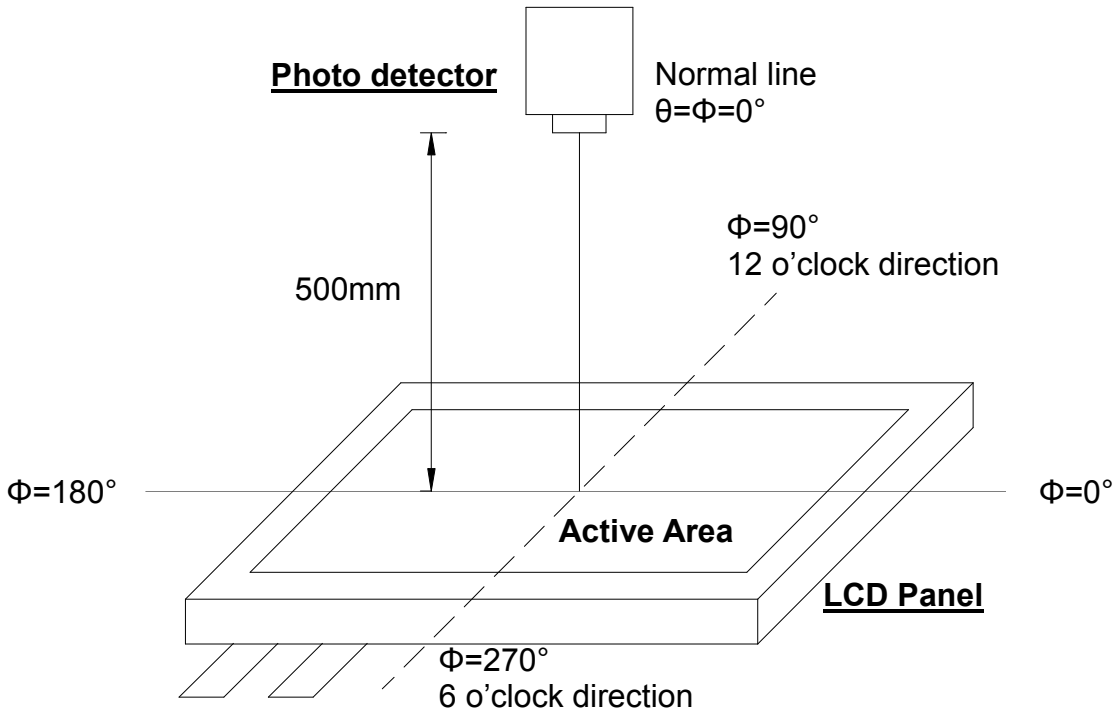


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

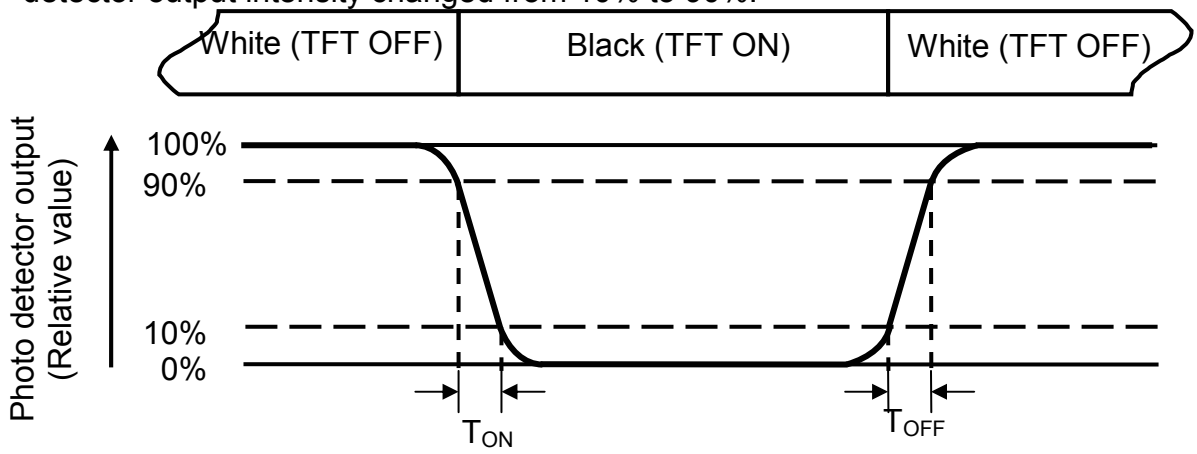


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=200mA.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length W----- Active area width

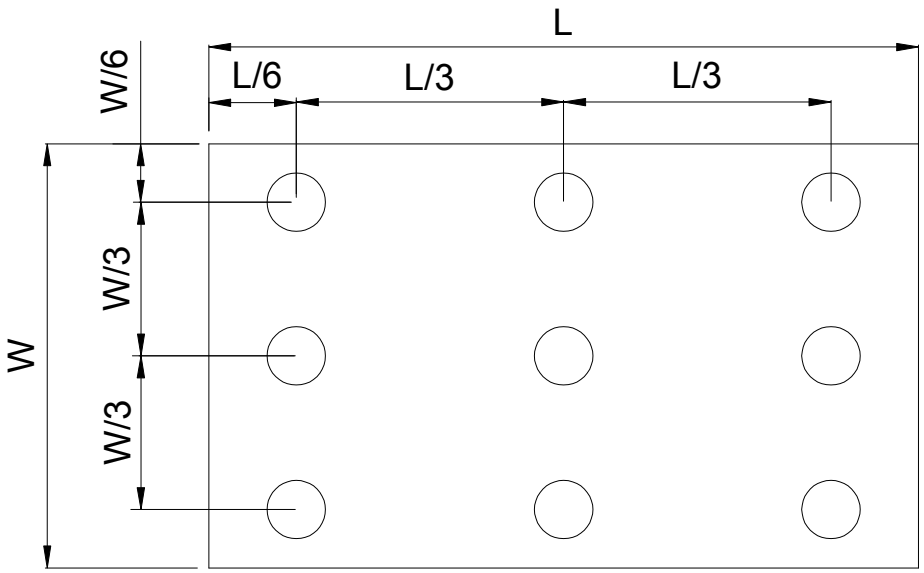


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

5 Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 90℃ 240 hrs	Note 1,Note 4
Low Temperature Storage	Ta = -40℃ 240hrs	Note 1,Note 4
High Temperature Operation	Ts = 80℃ 240hrs	Note 2,Note 4
Low Temperature Operation	Ta = -30℃ 240hrs	Note 1,Note 4
Operate at High Temperature and Humidity	+60℃, 90%RH 240 hrs	Note 4
Thermal Shock	-20℃/30 min ~ +70℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 4KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function tests, the product must have enough recovery time, at least 2 hours at room temperature.

6 General Precautions

6.1 Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3 Static Electricity

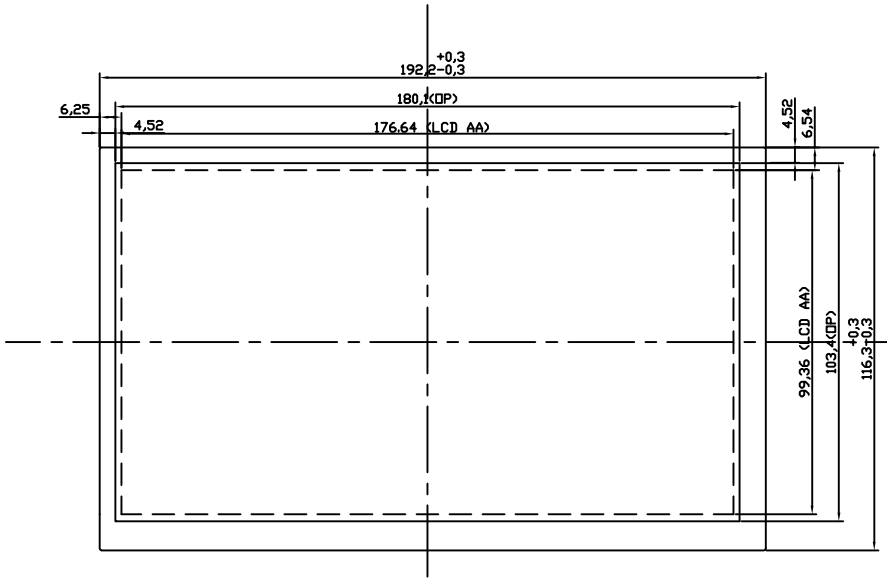
1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

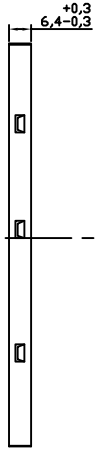
6.4 Storage

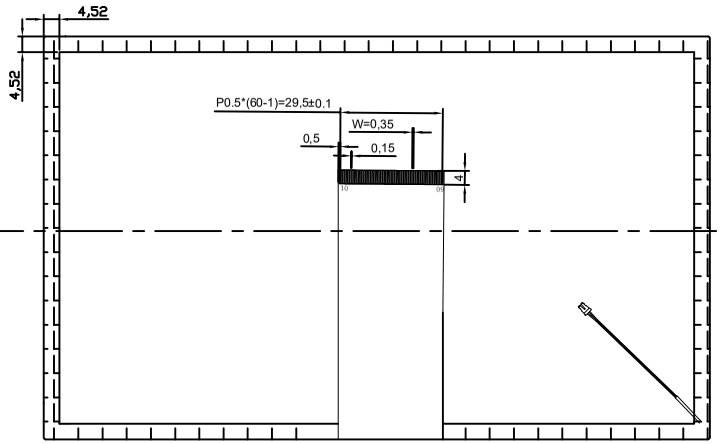
1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.







深圳市宇华微科技有限公司

YUHUA INT'LNOLOGY CO.,LIMITED

MODEL NUMBER :

G080SD60A2

CUSTOMER NO.:

DATE: 2022-04-09

Item(项目)		Symbol (符号)	min. (最小值)	typ. (中间值)	max. (最大值)	Unit (单位)	Condition (条件)
Main screen 主屏 (BL)	Luminance(亮度)	Lv				cd/m²	(BM-7测试值)
	Uniformity(均匀性)	Avg				%	
	Colour Coordinate (色坐标)	X					(照计度测试值) Lv=xxxx mcd
		Y					
Main screen 主屏 (LCM)	Luminance(亮度)	Lv	360	600		cd/m²	If= 300 mA (定电流测试) 样品亮度根据实际做出来样品亮度定
	Uniformity(均匀性)	Avg	75	80		%	
	Colour Coordinate (色坐标)	X	0.280	0.310	0.330		
		Y	0.300	0.330	0.340		
Forward Voltage(正向电压)		Vf	8.6	9.8	10.6	V	

• Operating Temperature:-30~+80° C (工 作 温 度) • Storage Temperature:-40~+90° C (储 存 温 度)

Design by: (设计)	ATEON	(审查)	Approval By: (核准)	Date: (日期)	2022.04.09	Page: (页数)	1/1

8 Package Drawing

8.1 Package Material Table

No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity	Remark
1	LCM Module	G080SD60A2	192.8 × 116.9 × 6.4	TBD	60pcs	
8	Total weight	TBD ± 5%				

8.2 Packaging Quantity

Total LCM quantity in Carton: no. of Partition 2 Rows x quantity per Row 30 = 60