

■ Preliminary Specification
□ Approval Specification

SPECIFICATION FOR LCD MODULE

Customer : _____
Product Model: AGO-101DS1-NN-N
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
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※ 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.

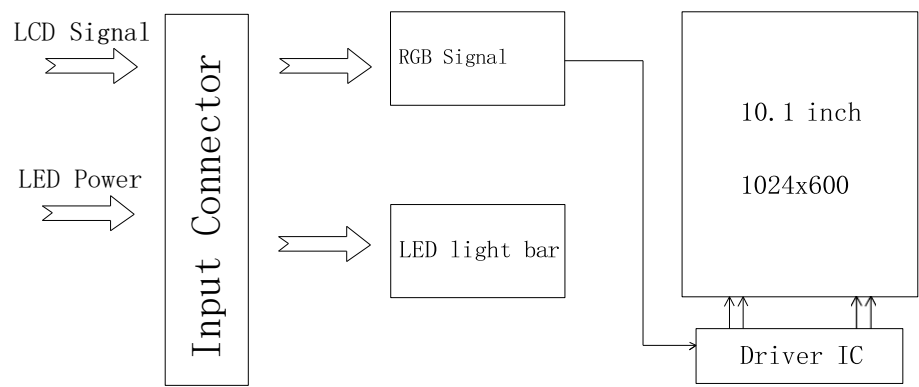
Revision History

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1. Block Diagram

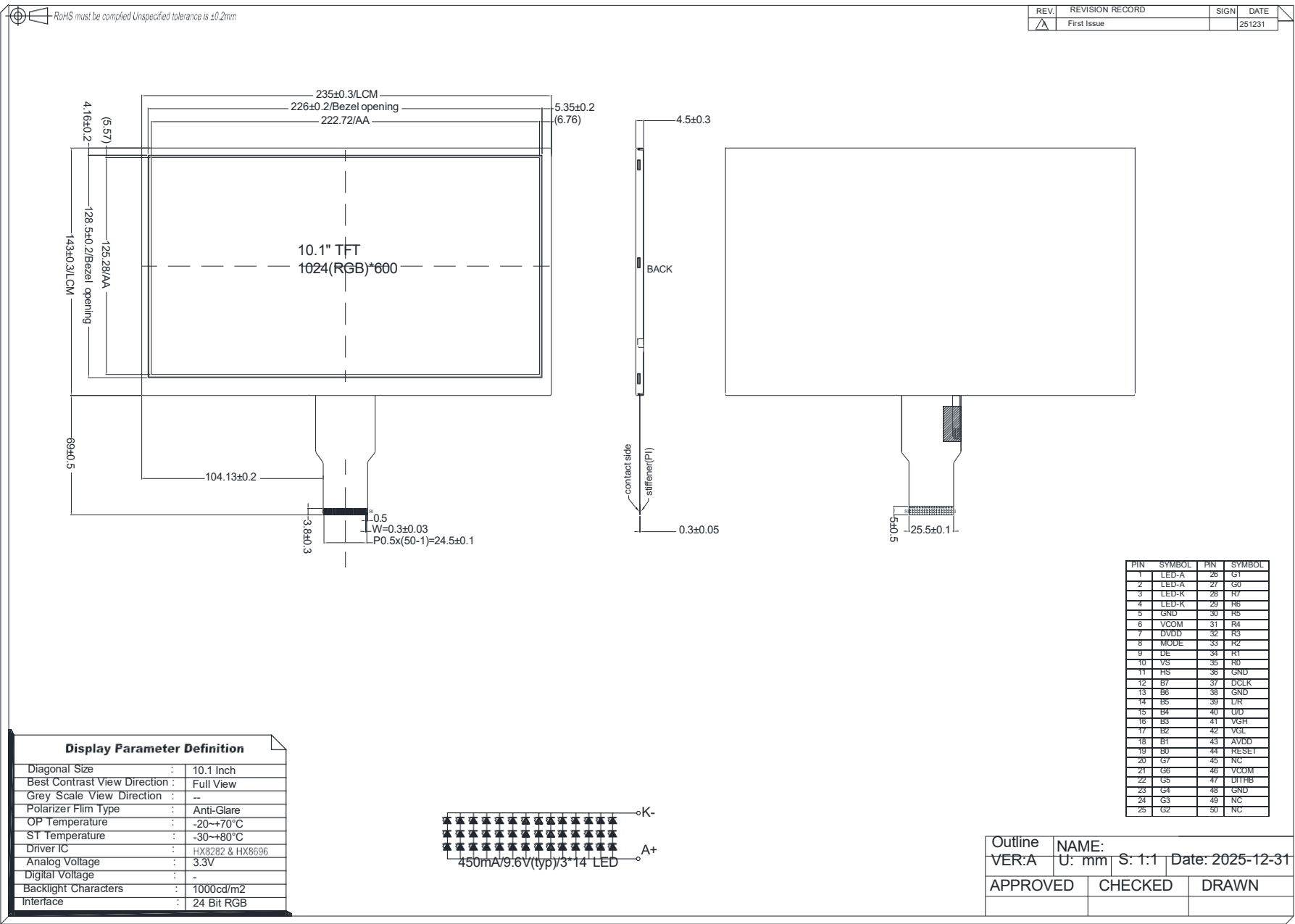


2. Technology Specifications

Feature	Details	Unit
Display Size(Diagonal)	10.1"	
LCD type	IPS TFT	
Display Mode	Transmissive /Normally Black	
Resolution	1024 RGB x 600	Pixel
View Direction	Full View	Best Image
Module Outline	235(H) x 143(V) x4.5(T) (Note1)	mm
Active Area	222.72(H) x125.28(V)	mm
Pixel Pitch	217.5(H) x 208.8(V)	um
Pixel Arrangement	RGB Vertical stripe	
Polarizer Surface	Anti-glare	
Display Colors	16.7M	
Interface	24-Bit RGB Interface	
Driver IC	HX8282&HX8696	

Nota AGT (01/09/2026): campo "Interface" corrigido de "8-Bit LVDS Interface" para "24-Bit RGB Interface" nesta copia. O original do fornecedor contradizia a si mesmo: a pinagem (pag. 7) e o desenho de dimensoes (pag. 5) ja indicavam RGB paralelo, nao LVDS. PDF original do fornecedor preservado sem alteracoes em AGO_101DS1-NN-N.pdf.

4. Outline Dimension



5.Interface Pin Assignment

No.	Symbol	Function
1	VLED+	LED Input Terminal I(Anode).
2	VLED+	LED Input Terminal I(Anode).
3	VLED-	Ground (Cathode).
4	VLED-	Ground (Cathode).
5	GND	Ground.
6	VCOM	Common voltage.
7	DVDD	Power for Digital Circuit.
8	MODE	DE/SYNC mode select.
9	DE	Data Input Enable.
10	VS	Vertical Sync Input.
11	HS	Horizontal Sync Input.
12	B7	Blue data(MSB)
13	B6	Blue data
14	B5	Blue data
15	B4	Blue data
16	B3	Blue data
17	B2	Blue data
18	B1	Blue data
19	B0	Blue data(LSB)
20	G7	Green data(MSB)
21	G6	Green data
22	G5	Green data
23	G4	Green data
24	G3	Green data
25	G2	Green data
26	G1	Green data
27	G0	Green data(LSB)
28	R7	Red data(MSB)
29	R6	Red data
30	R5	Red data
31	R4	Red data
32	R3	Red data
33	R2	Red data
34	R1	Red data
35	R0	Red data(LSB)

36	GND	Ground.
37	DCLK	Sample clock.
38	GND	Ground.
39	L/R	Left / right selection.
40	U/D	Up / Down selection.
41	VGH	Gate ON Voltage.
42	VGL	Gate OFF Voltage.
43	AVDD	Power for Analog Circuit.
44	RESET	Global reset pin.
45	NC	No connection.
46	VCOM	Common voltage.
47	DITHB	Dithering function.
48	GND	Ground.
49	NC	No connection.
50	NC	No connection.

6 .Operation Specifications

6.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply Voltage	DVDD	-0.5	+3.96	V
	AVDD	-0.5	+14.85	V
Storage temperature	Tstg	-30	+80	°C
Operating temperature	Top	-20	+70	°C

Note 1: If Ta below 50°C, the maximal humidity is 90%RH, if Ta over 50°C, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

6.2 DC Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Supply Voltage		DVDD	3.0	3.3	3.6	V
		AVDD	6.5	10.8	13.5	V
		VGH	19	22	25	V
		VGL	-13	-10	-7	V
		VCOM	4.39	5.39	6.39	V
Logic Low input voltage		V _{IL}	0	-	0.3*DVDD	V
Logic High input voltage		V _{IH}	0.7*DVDD	-	DVDD	V
Logic Low output voltage		V _{OL}	-	-	GND+0.4	
Logic High output voltage		V _{OH}	DVDD-0.4	-	-	
Current Consumption All Black	Logic	I _{CC} + I _{IN}	-	6	-	mA
	Analog					

Note 1: All of the voltage listed above are with respect to GND = 0v

Note 2: Device is subject to be damaged permanently if stresses beyond those absolute maximum rating listed above

6.3 Backlight Characteristic

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	VF	Ta=25 °C, IF=32mA/LED	8.4	9.6	10.4	V
Forward Current	IF	Ta=25 °C, VF=3.1V/LED	-	450	-	mA
Power dissipation	PD	-	-	4320		mW
Uniformity	Avg	-	-	80	-	%
LED working life(25°C)	-		-	20000	-	Hrs
Drive method	Constant current					
LED Configuration	42 White LEDs (3LEDs in one string and 14 groups in parallel)					

7. Signal Timing Characteristics

7.1 TTL mode AC electrical characteristics

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
VDD power on slew rate	T_{POR}	From 0V to 90% VDD	-	-	20	ms
GRB pulse width	T_{GRB}	-	50	-	-	μ s
DCLK cycle time	T_{cph}	-	14	-	-	ns
DCLK pulse duty	T_{cwh}	-	40	50	60	%
VSD setup time	T_{vst}	-	5	-	-	ns
VSD hold time	T_{vhd}	-	5	-	-	ns
HSD setup time	T_{hst}	-	5	-	-	ns
HSD hold time	T_{hhd}	-	5	-	-	ns
Data setup time	T_{dsu}	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	T_{dhd}	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	T_{esu}	-	5	-	-	ns
DE hold time	T_{ehd}	-	5	-	-	ns
Output stable time	T_{sst}	10% to 90% target voltage. CL=90pF, R=10K Ω (Cascade)	-	-	6	μ s
		Dual gate			3	

7.2 TTL mode AC electrical characteristics

- Vertical timing

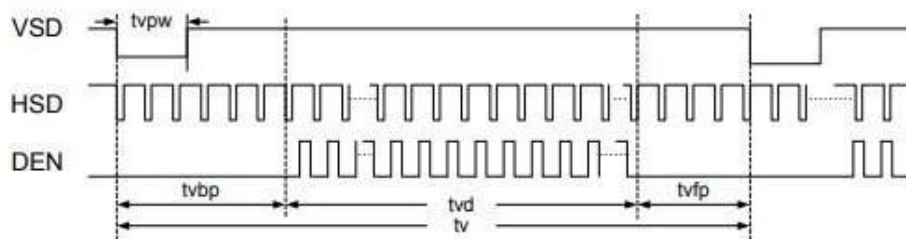


Figure 10.2: Vertical input timing diagram

- Horizontal timing

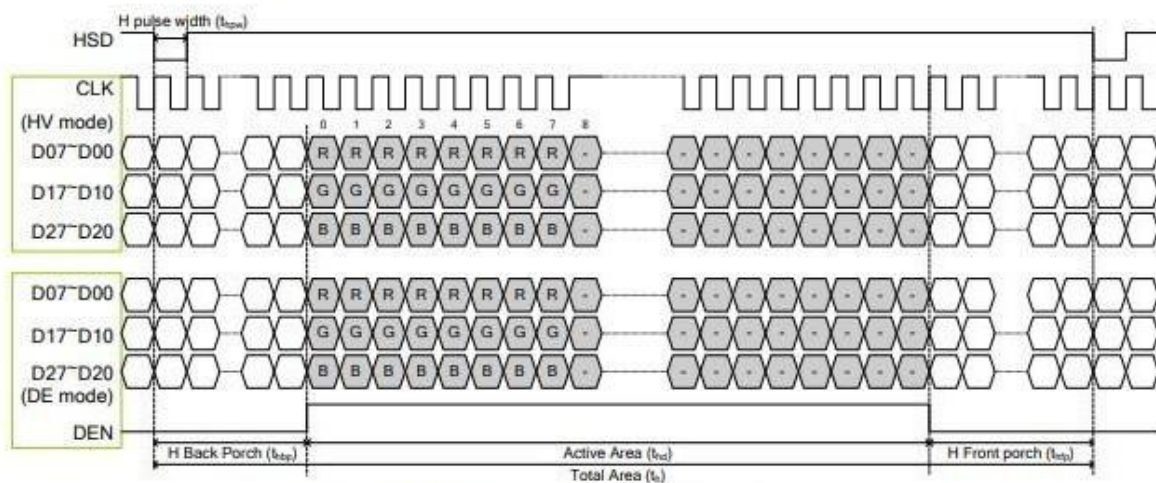


Figure 10.3: Horizontal input timing diagram

7.3 Parallel RGB input timing table

DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	40.8	51.2	67.2	MHz
Horizontal display area	thd	1024			DCLK
HSD period	th	1114	1344	1400	DCLK
HSD blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			T _H
VSD period	tv	610	635	800	T _H
VSD blanking	tvbp+tvfp	10	35	200	T _H

Table 10.4: DE mode (1024x600)

HV mode

• Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	44.9	51.2	63	MHz
Horizontal display area	thd	1024			DCLK
HSD period	th	1200	1344	1400	DCLK
HSD pulse Width	thpw	1	-	140	DCLK
HSD back porch	thbp	160			DCLK
HSD front porch	thfp	16	160	216	DCLK

Table 10.5: HV mode horizontal timing (1024x600)

• Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			T _H
VSD period	tv	624	635	750	T _H
VSD pulse width	tvpw	1	-	20	T _H
VSD back porch	tvbp	23			T _H
VSD front porch	tvfp	1	12	127	T _H

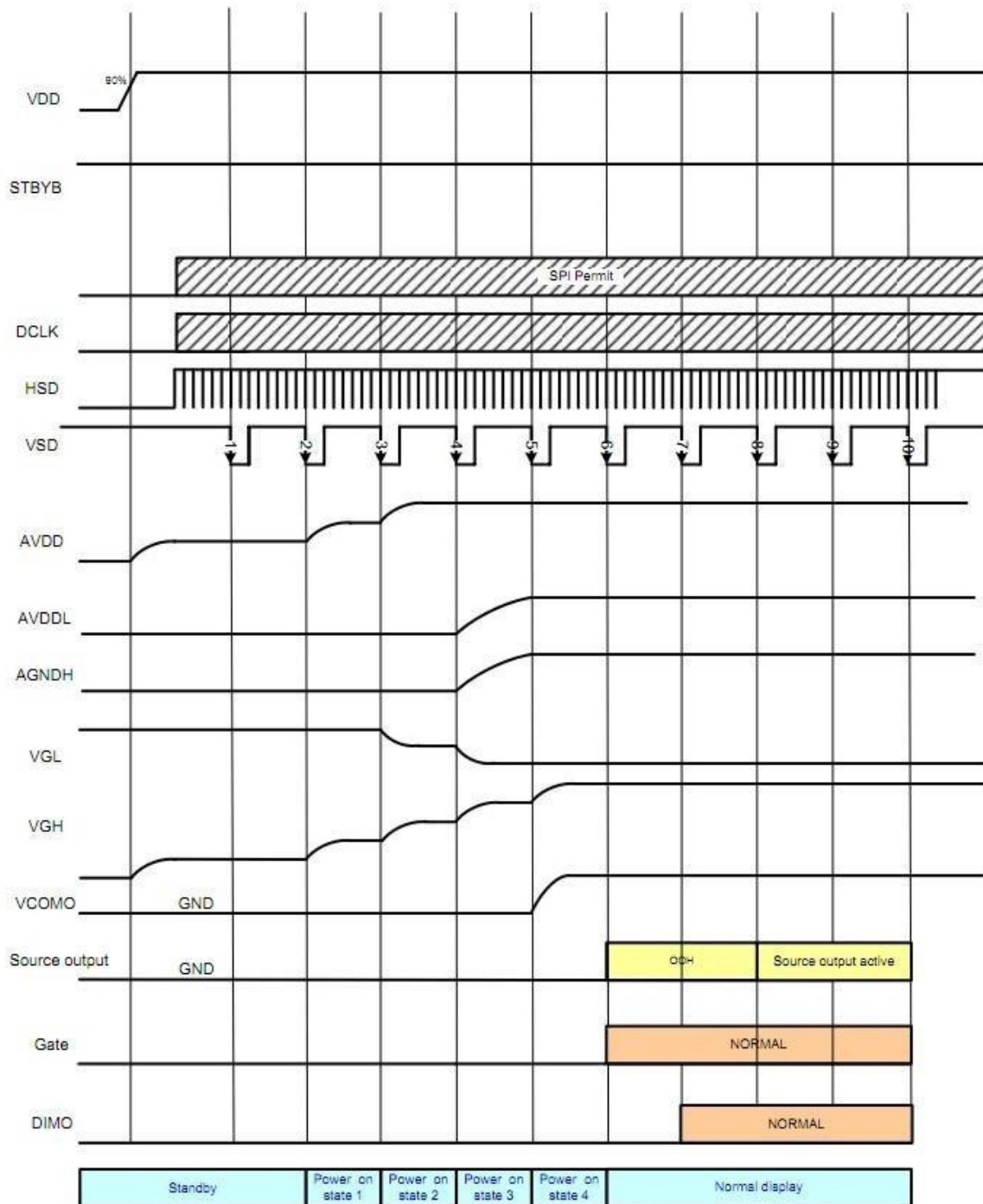
Table 10.6: HV mode vertical timing (1024x600)

7.4 Power On/Off Sequence

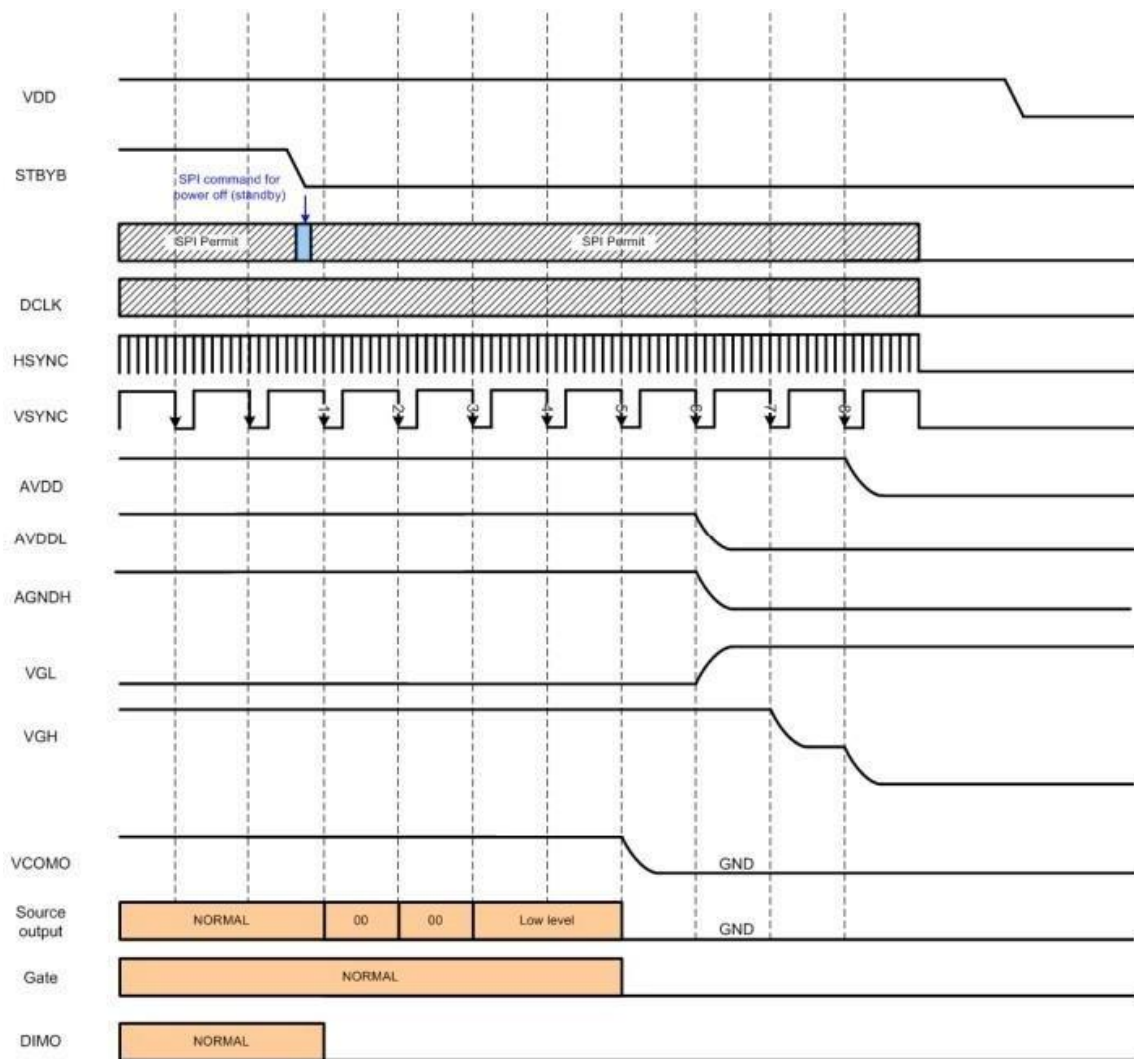
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND→ AVDD, AGND→ V1 to V14

Power off: V1 to V14→AVDD, AGND→VDD, GND



Power on timing sequence



Power off timing sequence

8. Optical specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	80	-	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	80	-	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	80	-	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	80	-	-		
Response time Rise+ Fall	T_{RT}	Normal $\theta=\Phi=0^\circ$	-	25	35	msec	Note 3
Contrast ratio	CR		800	1000	-	-	Note 4
Color chromaticity	R_X		Typ. -0.05	TBD	Typ. +0.05		Note 2 Note 5 Note 6
	R_Y			TBD			
	G_X			TBD			
	G_Y			TBD			
	B_X			TBD			
	B_Y			TBD			
	W_X			0.327			
	W_Y			0.338			
NTSC Ratio(Gamut)	Ratio		-	50.81	-	%	
Luminance (TFT)	L		800	1000	-	cd/m ²	Note 6

Note 1: Definition of viewing angle range

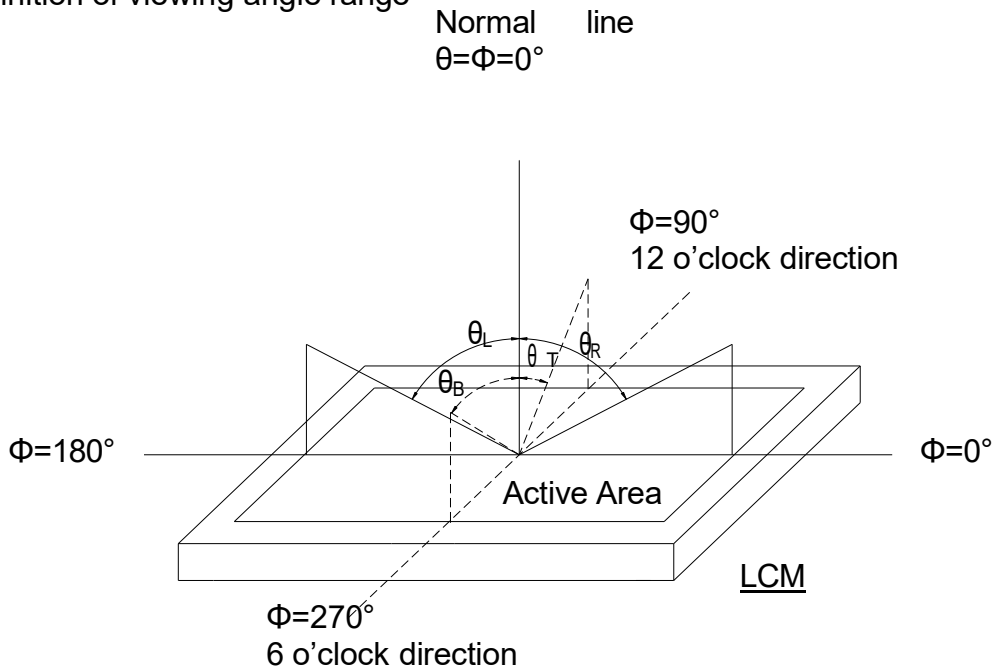


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-5A, other items are measured by BM-7A/Field of view: 1° /Height: 500mm.)

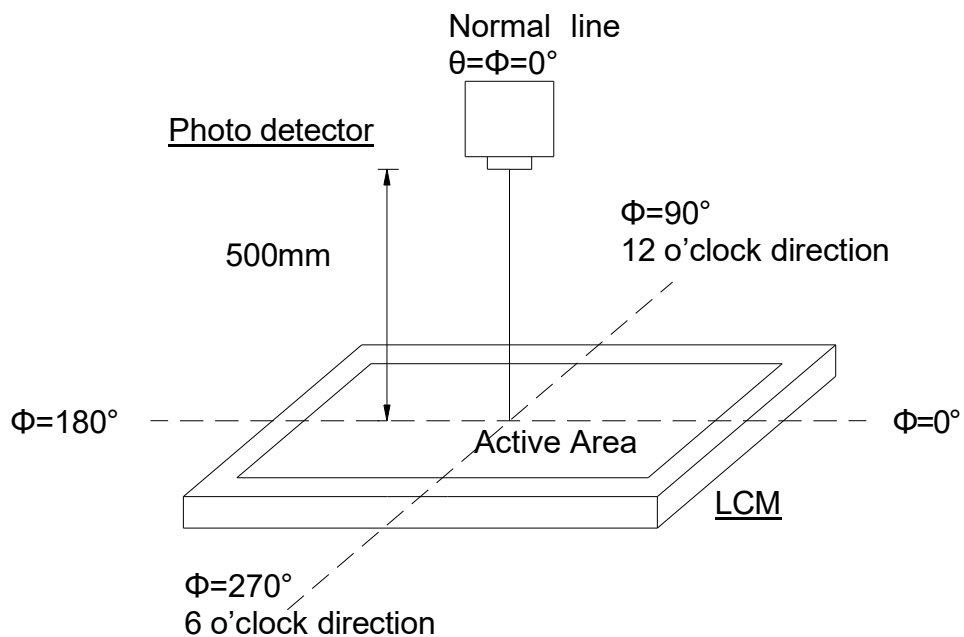


Fig. 4-2 Optical measurement system setup

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%.

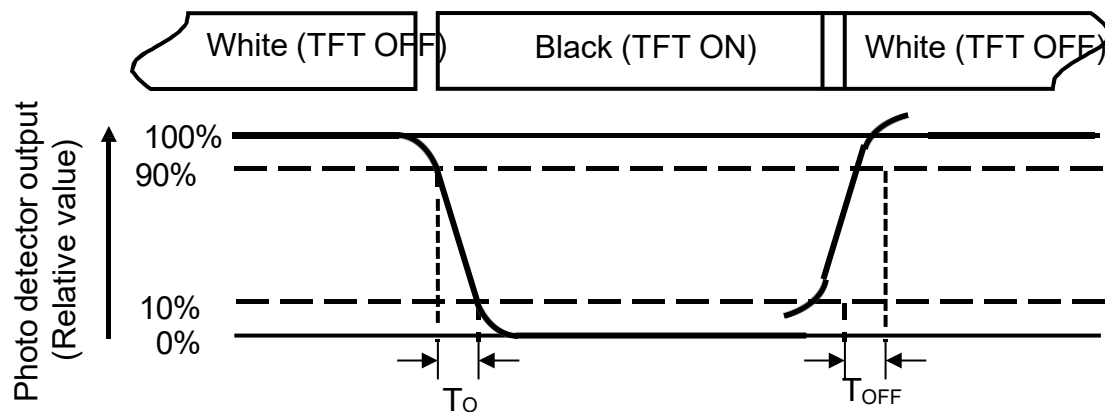


Fig. 4-3 Definition of response time

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.

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.

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

W-----Active area length

H----- Active area width

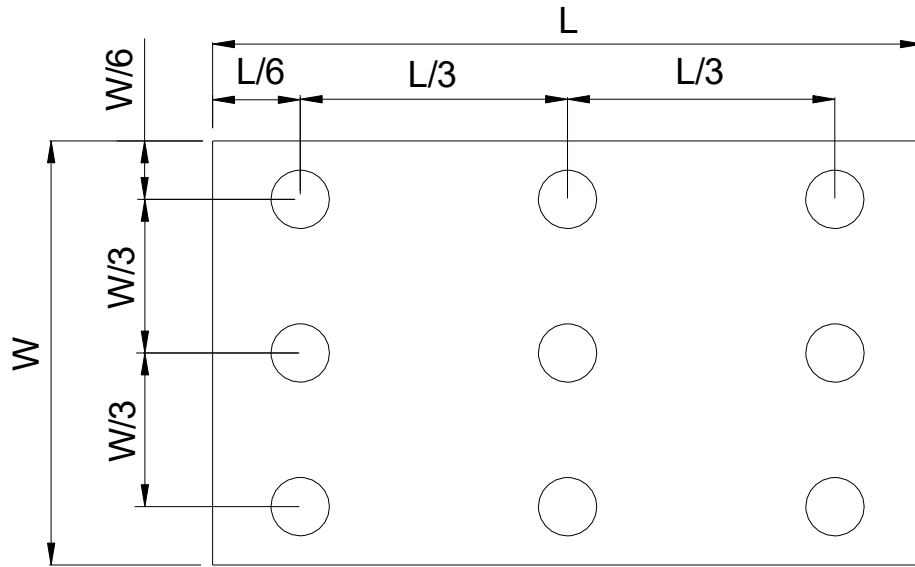


Fig. 4-4 Definition of measuring points

$B_{\max}$: The measured maximum luminance of all measurement position.

$B_{\min}$: The measured minimum luminance of all measurement position.

Note 8: Definition of Color of CIE Coordinate and NTSC Ratio.

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

9. Reliability Test Conditions And Methods

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	70°C, 96Hrs	2	GB/T2423.2-2008
2	Low Temperature Operating	-20°C, 96Hrs	2	GB/T2423.1-2008
3	High Humidity	60°C, 90%RH, 96Hrs	2	GB/T2423.3-2006
4	High Temperature Storage	80°C, 96Hrs	2	GB/T2423.2-2008
5	Low Temperature Storage	-30°C, 96Hrs	2	GB/T2423.1-2008
6	Thermal Cycling Test	-20°C, 60min~70°C, 60min, 10 cycles.	2	GB/T2423.22-2012
7	Packing vibration	Frequency range:10Hz~50Hz Acceleration of gravity:5G X,Y,Z 30 min for each direction.	2	GB/T5170.14-2009
8	Electrical Static Discharge	Air:±8KV 150pF/330Ω 5 times	2	GB/T17626.2-2006
		Contact:±4KV 150pF/330Ω 5 times		
9	Drop Test (Packaged)	Height:80 cm,1 corner, 3 edges,6 surfaces.	2	GB/T2423.8-1995

Note1. No defection cosmetic and operational function allowable.

Note2. Total current Consumption should be below double of initial value