

Product Specifications

Customer	
Model Name	GDS050WV43
Description	Standard LCD Module 800(RGB)x480 Dots 5" TFT LCD
Date	2013/1/14
Revision	1.0

Engineering			
Check	Date	Prepared	Date
	2013/1/14		2013/1/14

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1 Record of Revision

Rev	Issued Date	Description	Editor
1.0	2013/1/14	First Release.	LI TANG

2 General Specifications

Feature		Spec
Characteristics	Size	5inch
	Resolution	800(horizontal) * 480(Vertical)
	Interface	RGB-24bit
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.135 x 0.135
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally White
	Driver IC	NV1057&NV3858-B
	Surface Treatment	3H
	Viewing Direction	12 O'clock
Mechanical	LCM (W x H x D) (mm)	120.7*76.3*3.1
	Active Area(mm)	108 x64.8
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	12 LEDs

Note 1: Viewing direction is follow the data which measured by optics equipment..

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5%

3 Input/Output Terminals

No.	Symbol	Description
1	VLED1-	Backlight LED Cathode
2	VLED1+	Backlight LED Anode.
3	GND	Ground
4	VDD	Power supply
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	GND	Ground
30	DCLK	Clock for input data. Data latched at rising/falling edge of this signal. Default falling edge. Normally pull low.
31	DISP	Standby mode. Normally pulled high. DISP="1": Normally operation (Default) DISP="0": Timing controller, source driver will turn off ,all output are High-Z.
32	NC	No connected
33	NC	No connected
34	DE	Data input enable. Active high to enable the data input bus under "DE Mode ". Normally pull low.
35	NC	No connected
36	GND	Ground
37	NC(XR)	The right side signal of TP
38	NC(YD)	The down side signal of TP
39	NC(XL)	The left side signal of TP
40	NC(YU)	The up side signal of TP

4 Absolute Maximum Ratings

Driving TFT LCD Panel

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.5	3.96	V	
Operating Temperature	T_{OPR}	-20	70	°C	
Storage Temperature	T_{STG}	-30	80	°C	

5 Electrical Characteristics

5.1 Driving TFT LCD Panel

$T_a = 25\text{ }^{\circ}\text{C}$

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		V_{DD}	2.7	3.3	3.6	V	
Input Signal Voltage	Low Level	V_{IL}	GND	-	0.3x VDD	V	
	High Level	V_{IH}	0.7x VDD	-	VDD	V	
Output Signal Voltage	Low Level	V_{OL}	-	-	VSS+0.4	V	
	High Level	V_{OH}	VDD-0.4	-	-	V	
(Panel+LSI) Power Consumption		Black Mode (60Hz)	-	-		nW	
		Standby	-	-	-	uW	

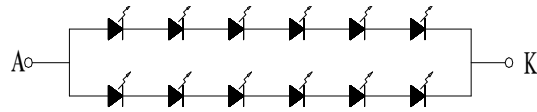
5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	40	60	mA	
Forward Voltage	V_F	-	19.2		V	
Backlight Power consumption	W_{BL}	-	TBD	-	W	

Note 1: Each LED : $I_F = 20\text{ mA}$, $V_F = 3.2\text{ V}$.

Note 2: Optical performance should be evaluated at $T_a = 25\text{ }^{\circ}\text{C}$ only.

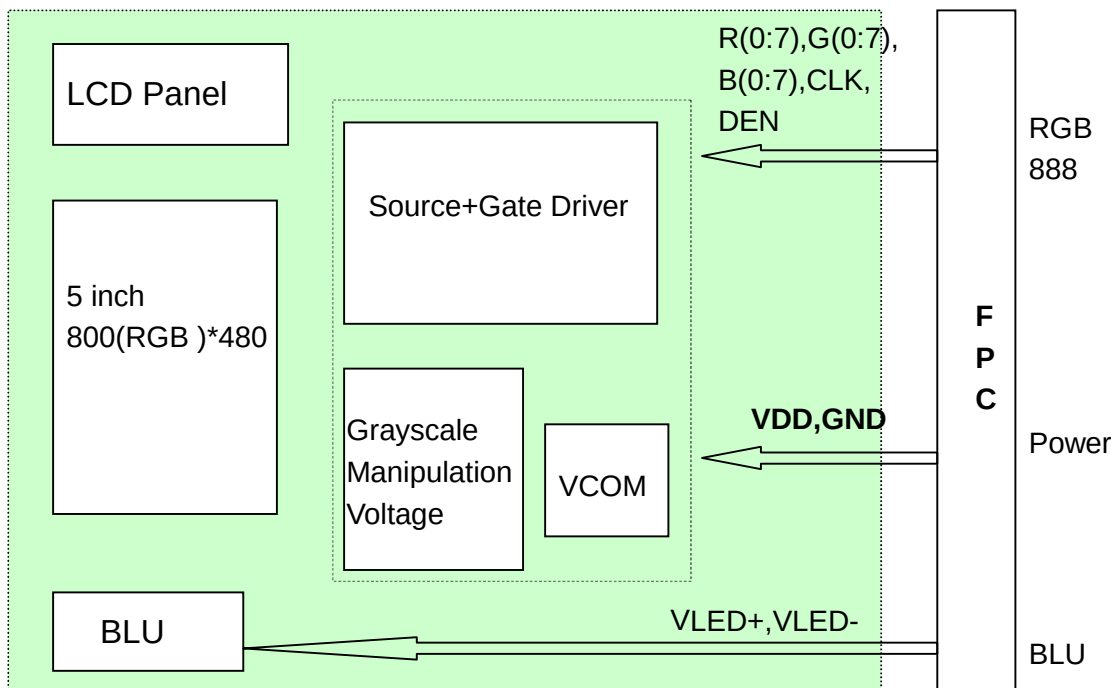
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.



CIRCUIT DIAGRAM

Figure : LED connection of backlight

5.3 Block Diagram



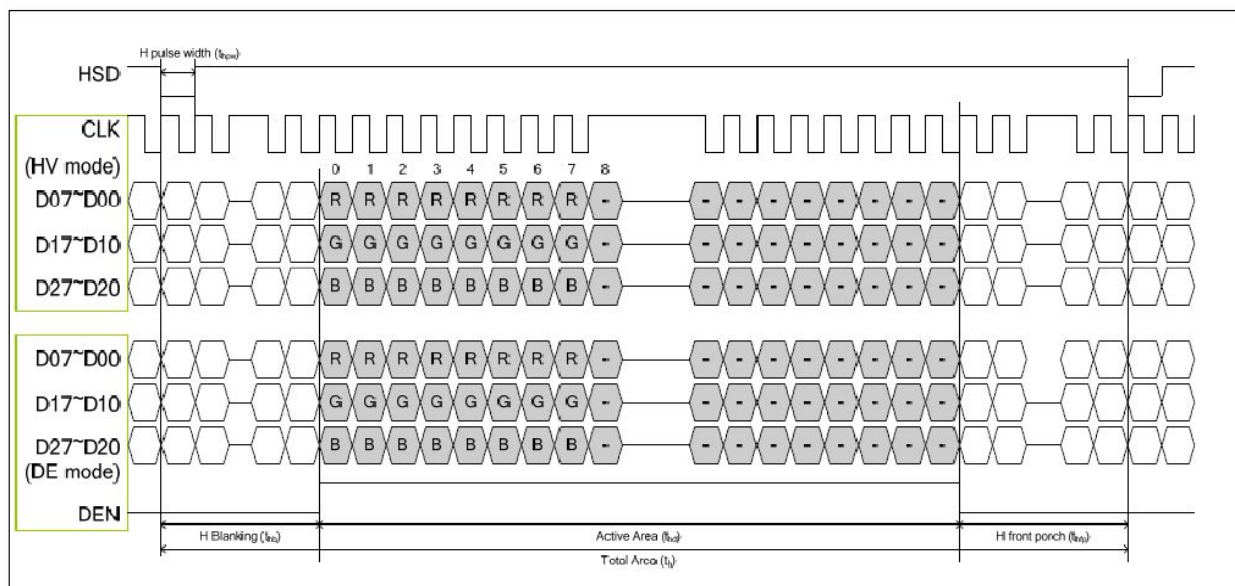
6 Interface Timing

6.1 AC electrical characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	Thst	8	-	-	ns
HS hold time	Thhd	8	-	-	ns
VS setup time	Tvst	8	-	-	ns
VS hold time	Tvhd	8	-	-	ns
Data setup time	Tdsu	8	-	-	ns
Data hold time	Tdhd	8	-	-	ns
DE setup time	Tesu	8	-	-	ns
DE hold time	Tehd	8	-	-	ns
VDD Power On Slew rate	T _{POR}	-	-	20	ns
RSTB pulse width	T _{Rst}	10	-	-	ns
CLKIN cycle time	Tcph	20	-	-	ns
CLKIN pulse duty	Tcwh	40	50	60	%
Output stable time	Tsst	-	-	6	us

6.2 data input format

Horizontal timing



Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	800			DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	1	-	40	DCLK
HS Back Porch(Blanking)	thb	46			DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	85	256	400	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tv	480			T _H
VS period time	tv	513	525	650	T _H
VS pulse width	tvpw	3	-	20	T _H
VS Back Porch(Blanking)	tvb	23			T _H
VS Front Porch	tvfp	7	22	147	T _H
DE mode Blanking	tv-tvd	30	45	170	T _H

Wave form

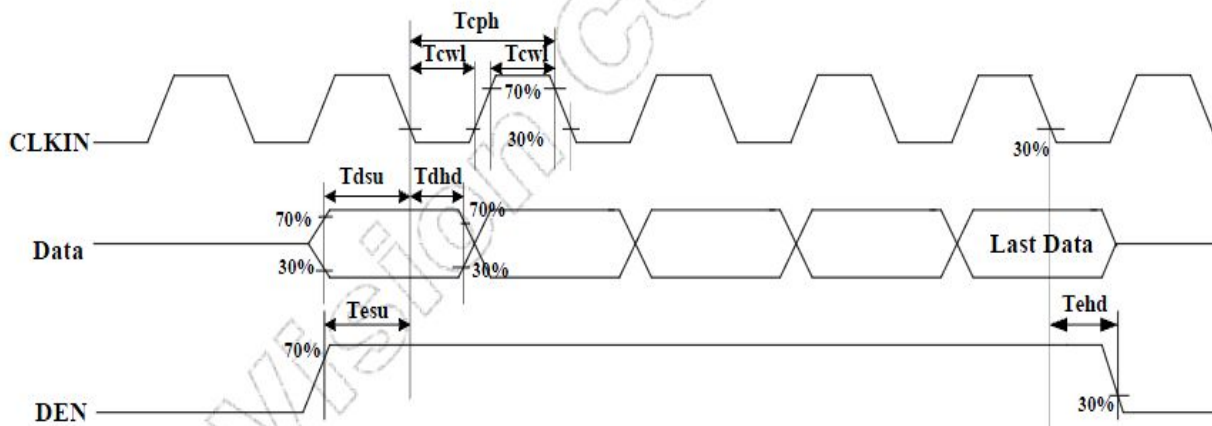
Timing waveform table

Parallel 24-bit RGB mode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	64			CLKIN	-
Time from HSD to LD	Thld	64			CLKIN	-
Time from HSD to STV	Thstv	2			CLKIN	-
Time from HSD to CKV	Thckv	20			CLKIN	-
Time from HSD to OEV	Thoev	4			CLKIN	-
LD Pulse Width	Twld	10			CLKIN	-
CKV Pulse Width	Twckv	66			CLKIN	-
OEV Pulse Width	Twoev	74			CLKIN	-

Parallel 24-bit RGB mode

Input clock and data timing waveform



6.3 Power on/off

Power on/off Sequence

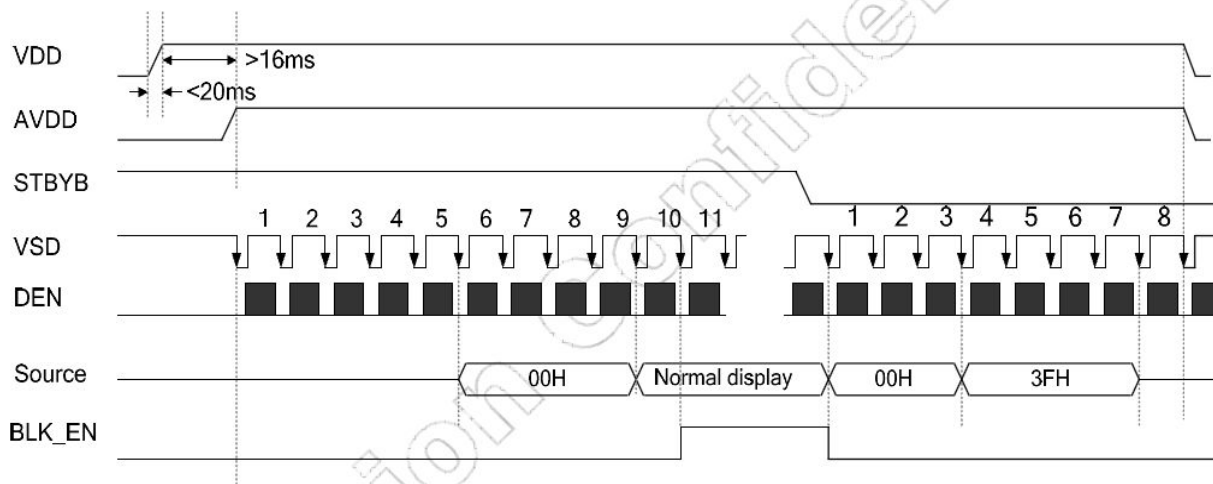
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON: VDD,VSS → VDDA,VSSA

Power OFF: VDDA,VSSA → VDD,VSS

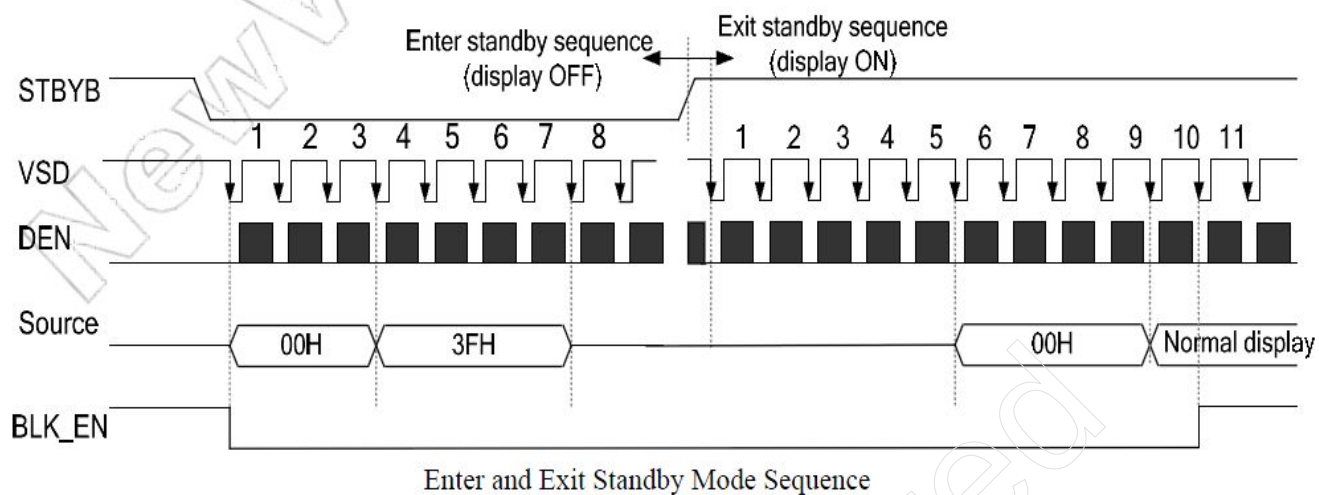
Power on/off control

NV3858 has a power on/off sequence control function. In order to prevent IC from power on reset fail, the rising time (T_{POR}) of the digital power supply VDD should be maintained within the given specifications. Please refer to "AC Characteristics" for more detail on timing.



Power on/off Timing Sequence

Enter and exit standby mode sequence



7 Optical Characteristics

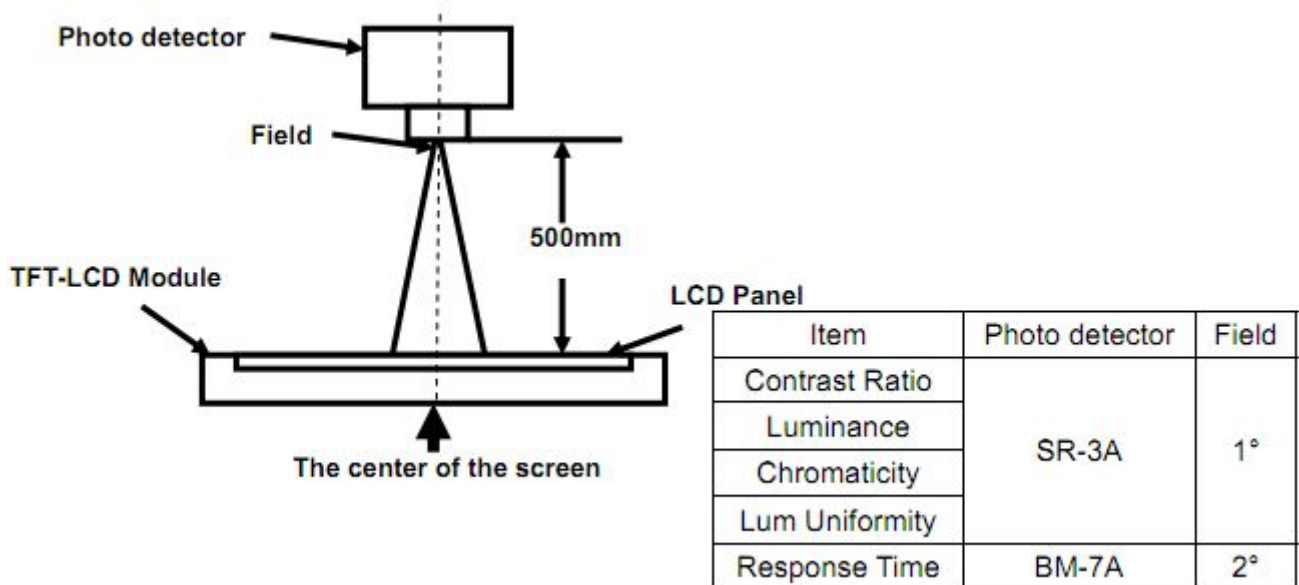
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_{T}	Center CR≥10	40	50	-	Degree.	Note2
		θ_{B}		60	70	-		
		θ_{L}		60	70	-		
		θ_{R}		60	70	-		
Contrast Ratio		CR	$\Theta = 0$	400	500		-	Note1, Note3
Response Time		T _{ON}	25° C	-	20	30	ms	Note1, Note4
		T _{OFF}						
Chromaticity	White	X _W	Backlight is on	TBD	TBD	TBD	-	Note1, Note5
		Y _W		TBD	TBD	TBD	-	
	Red	X _R		TBD	TBD	TBD	-	
		Y _R		TBD	TBD	TBD	-	
	Green	X _G		TBD	TBD	TBD	-	
		Y _G		TBD	TBD	TBD	-	
	Blue	X _B		TBD	TBD	TBD	-	
		Y _B		TBD	TBD	TBD	-	
Uniformity		U		-	-	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		. L		-	300			Note1, Note7

Test Conditions:

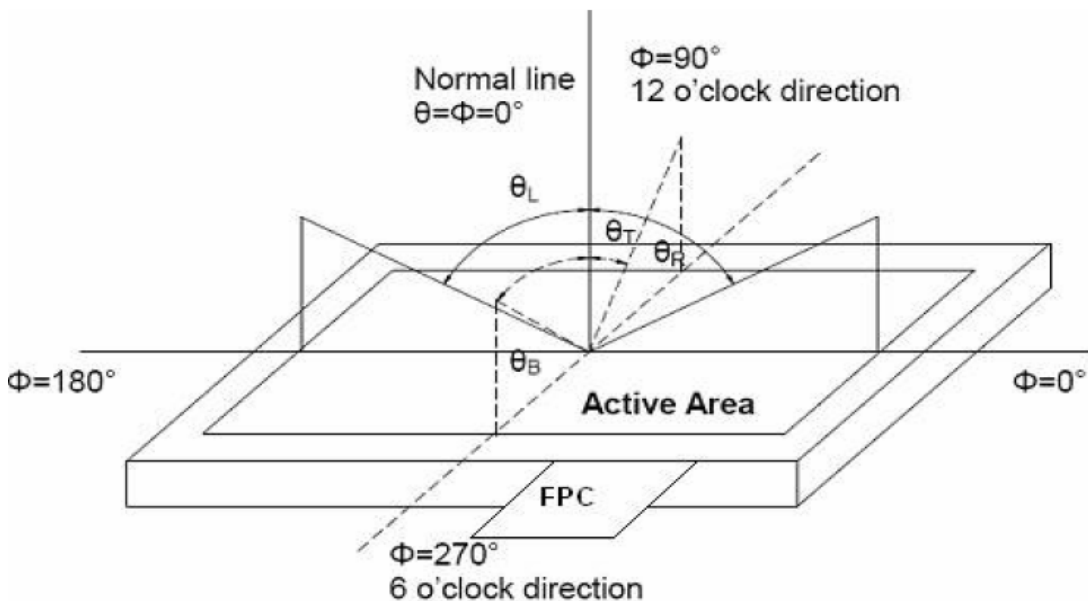
1. IF= 20mA(one channel),the ambient temperature is 25.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.
viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).



Note 3: Definition of contrast ratio

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

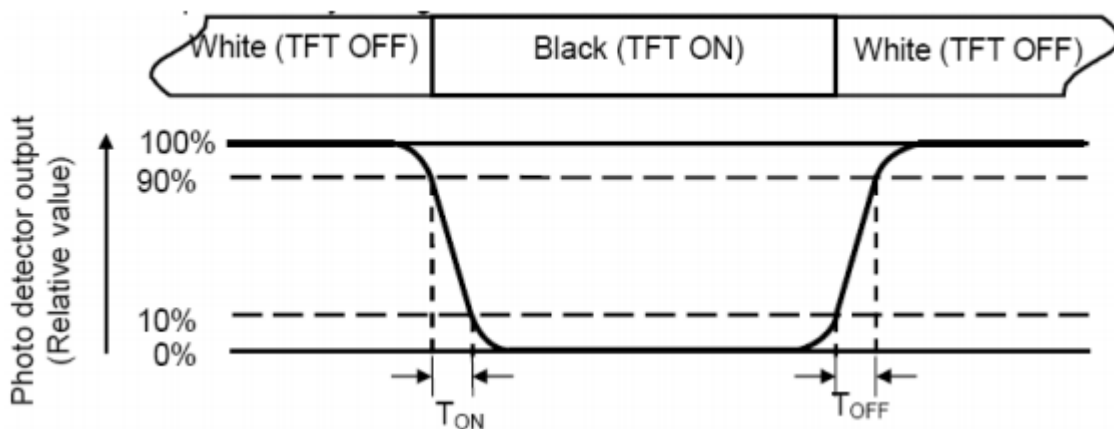
"White state ":The state is that the LCD should driven by Vwhite.

"Black state": The state is that the LCD should driven by Vblack.

V_{white}: To be determined V_{black}: To be determined.

Note 4: 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%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max}$$

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

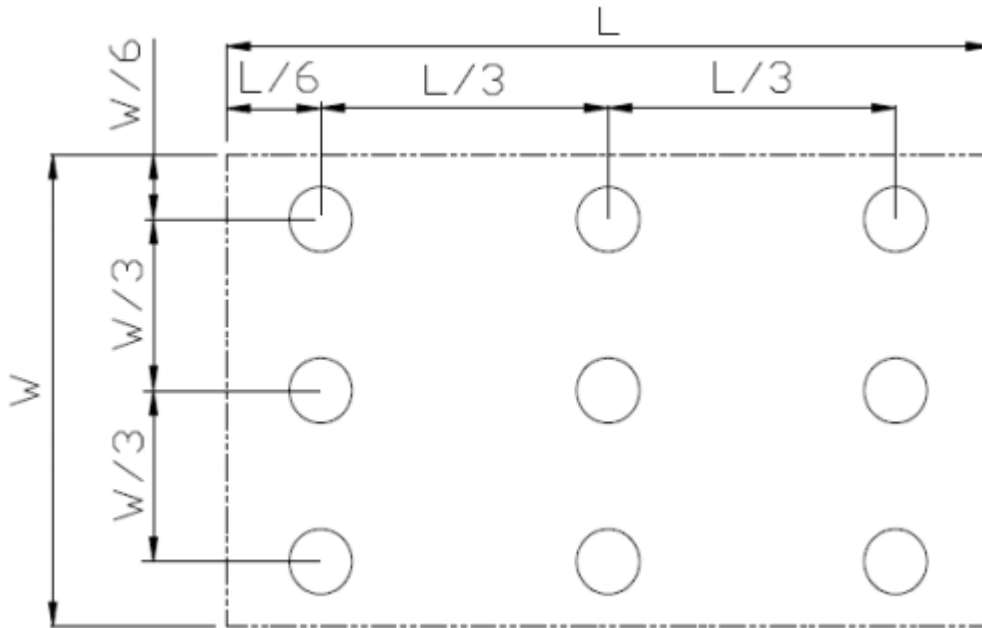


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

Measure the luminance of white state at center point.

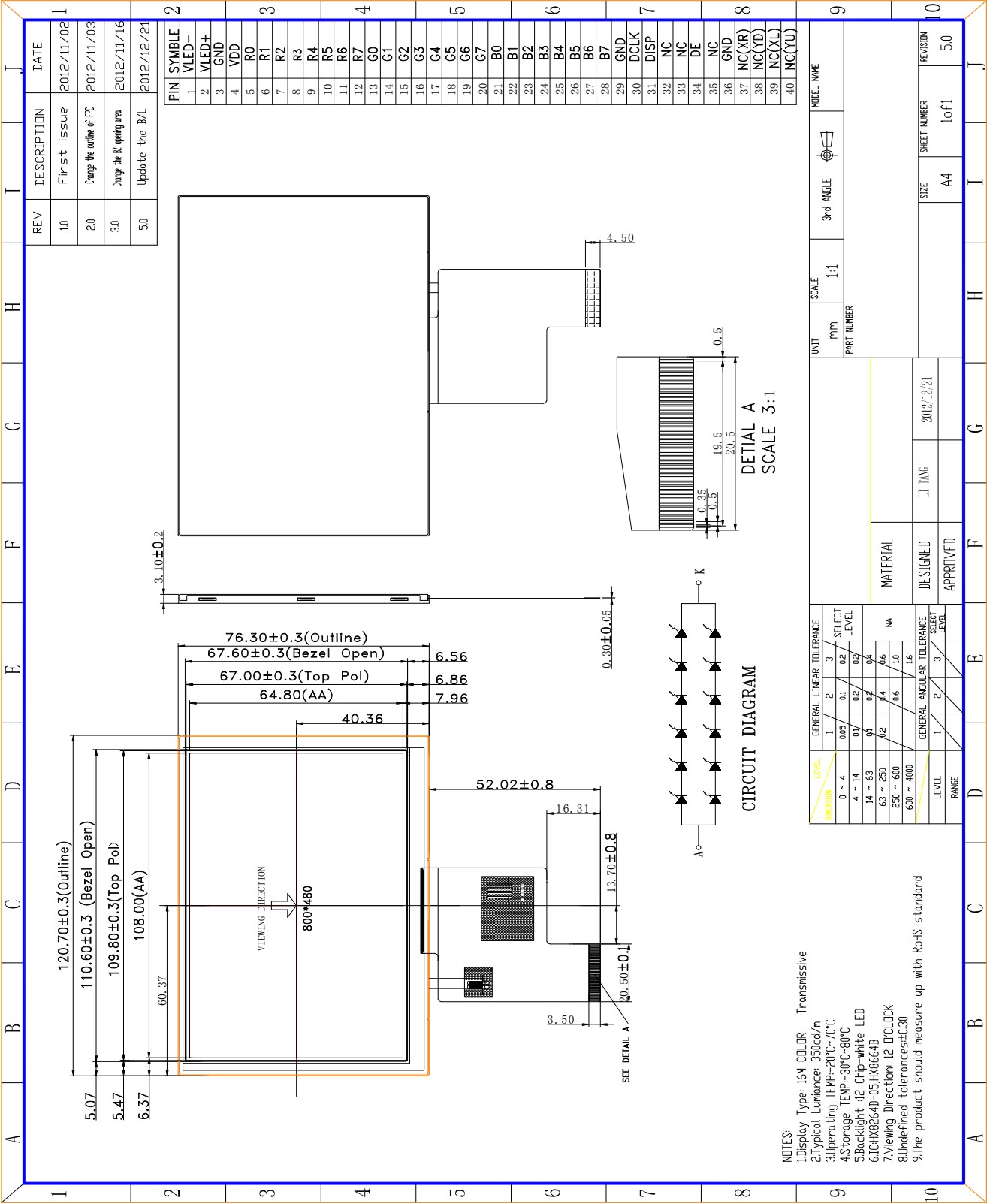
8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	T _s = +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	T _a = -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	T _a = +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	T _a = +70℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	T _a = +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	C=150pF, R=330 Ω, 5 points/panel Air: ±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ± Y, ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_s is the temperature of panel's surface.

2. T_a is the ambient temperature of sample.

9 Mechanical Drawing



10 Packing

TBD

11 Precautions For Use of LCD modules

11.1 Handling Precautions

11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

11.1.7. If the logic circuit power is off, do not apply the input signals.

11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1. Be sure to ground the body when handling the LCD Modules.

11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

11.2 Storage Precautions

11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

11.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.