

**7.0" WXGA**  
**High brightness color TFT-LCD module**

**Model: VM07B6 V6**

**Date: Nov. 30<sup>th</sup>, 2022**

**Note: This specification is subject to change without  
notice**

<b>Customer :</b> _____
<b>Date :</b> _____

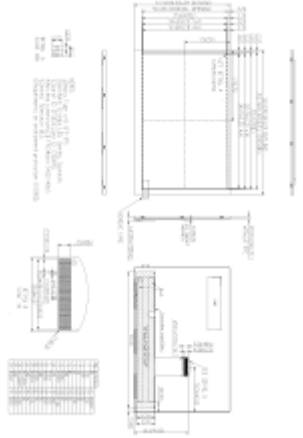
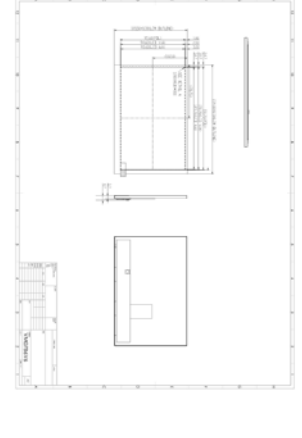
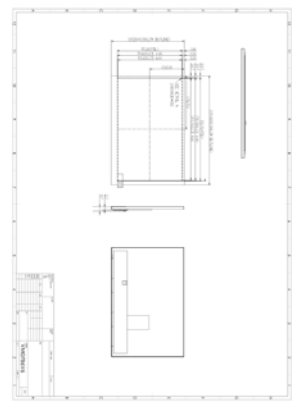
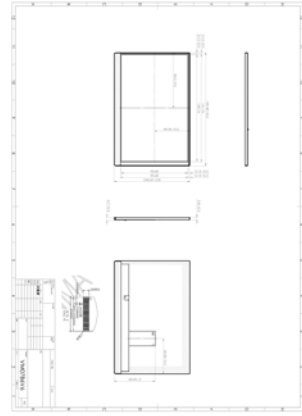
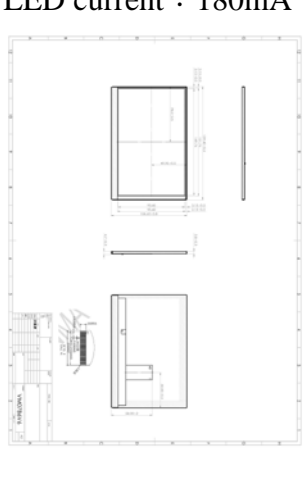
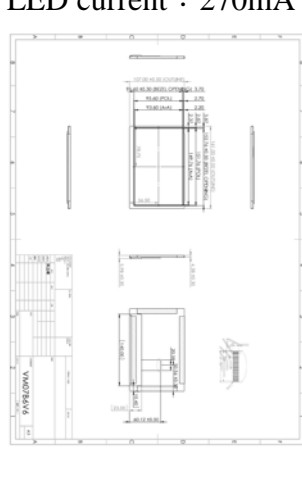
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RECORD OF REVISION

Version and Date	Page	Old description	New description	Remark
0.1 2016/09/11	All	First Edition for customer		
0.2 2018/04/26	16	Luminance : min 1050 typ 1300	Luminance : min 960 typ 1300	
0.3 2021/02/25	22			
0.4 2020/03/02	22	Outline : 159.5x105.5x4.7	Outline : 159.4x106.65x4.7	
0.5 2022/04/26	19			
0.6 2022/05/03	22	LED voltage : 27V LED current : 180mA	LED voltage : 18V LED current : 270mA	
				

0.7 2022/11/30	6 13 19	LED power : 4.86W  LED current : 270mA MTBF : 80,000hr	LED power : 3.78W Remove Vcom characteristics LED current : 210mA MTBF : 100,000hr	
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## 1. Handling Precautions

- 1) Since front polarizer is easily damaged, pay attention not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- 5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
- 6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
- 7) Do not open or modify the Module Assembly.
- 8) Do not press the reflector sheet at the back of the module to any directions.
- 9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center.
- 10) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.

## 2. General Description

### 2.1 Overview

VM07B6 V5 is specification applies to the Color Active Matrix Liquid Crystal Display composed of a TFT-LCD display a LED backlight system. The screen format is intended to support 1280(H) x 800(V) WXGA screen and 16.7M colors.

LED driving board for backlight unit is not included.

### 2.2 Features

- High brightness display, 1300nits.
- Extra wide view angle
- LVDS interface
- RoHS Compliance

### 2.3 Application

Industrial Application.

2.4 Display specifications

Items	Unit	Specification
Screen Diagonal	inch	7.0
Active Area	mm	149.76 (H) x 93.6 (V)
Pixels H x V	pixels	1280 x3(RGB) x 800
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally Black
White luminance (center)	Cd/m <sup>2</sup>	1300 (Typ.)
Contrast ratio		800 (Typ.)
Optical Response Time	msec	35 ms (Typ. on/off)
Normal Input Voltage Vcc	Volt	3.3 / 11 / 18 / -6.8 / 3.55
Power Consumption (VDD Line + LED backlight)	Watt	TBD (Vcc line=TBD; LED line=3.78W)
Weight	Grams	120
Physical size	mm	161.0 (H) x 107.0 (V) x 5.98 (D)
Electrical Interface		LVDS
Support Colors		16.7M colors
Surface Treatment		Hard coating (3H) & Anti-Glare
Temperature range		
Operating	°C	-20 ~ 70 (TFT surface)
Storage	°C	-30 ~ 80
RoHS Compliance		RoHS Compliance

2.5 Optical characteristics

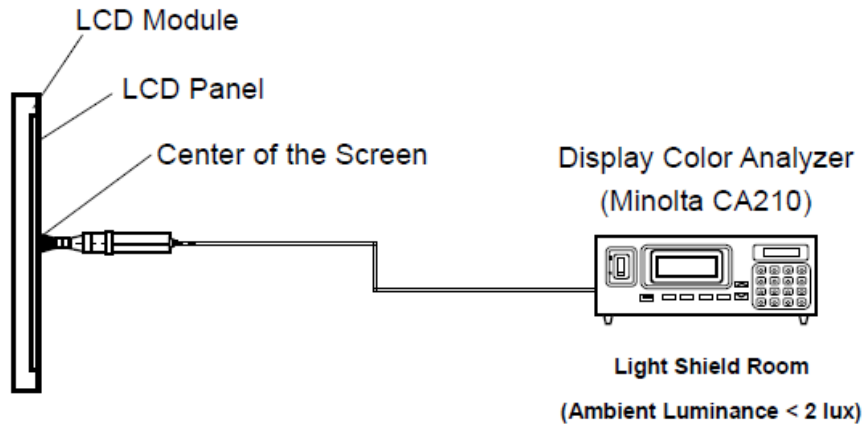
The following optical characteristics are measured under stable condition at 25 °C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	80	88		2
		CR $\geq$ 10 (Left)	80	88		
		Vertical (Up)	80	88		
		CR $\geq$ 10 (Down)	80	88		
Contrast Ratio		Normal Direction		800		3
Response Time	msec	$\square$ T <sub>ON</sub> / T <sub>OFF</sub>		35		4
Color / Chromaticity Coordinates (CIE)		Red x	-0.05	0.587	+0.05	5
		Red y		0.348		
		Green x		0.340		
		Green y		0.584		
		Blue x		0.153		
		Blue y		0.109		
Color coordinates (CIE) White		White x		0.306		
		White y		0.327		
Center Luminance	Cd/m <sup>2</sup>		960	1300		6
Luminance Uniformity	%			70		7
Crosstalk (in 60 Hz)	%				4.0	

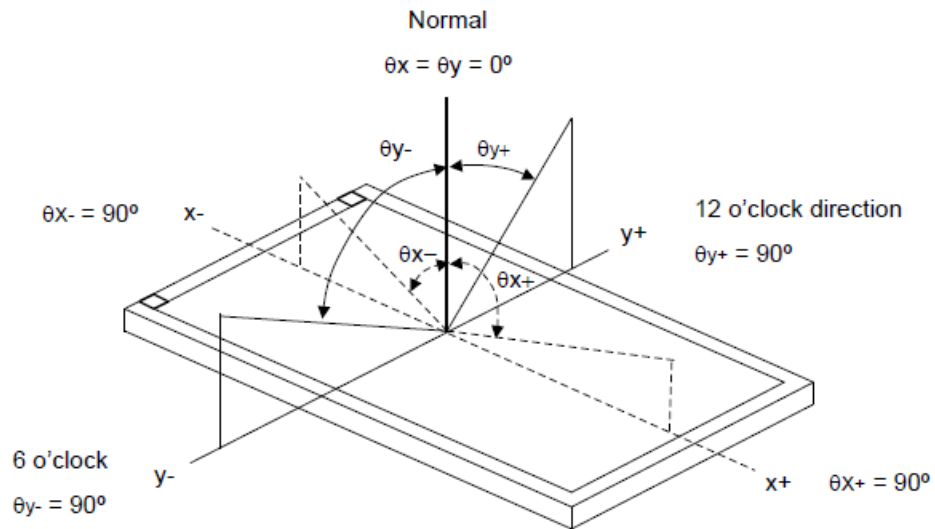


Note 1: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



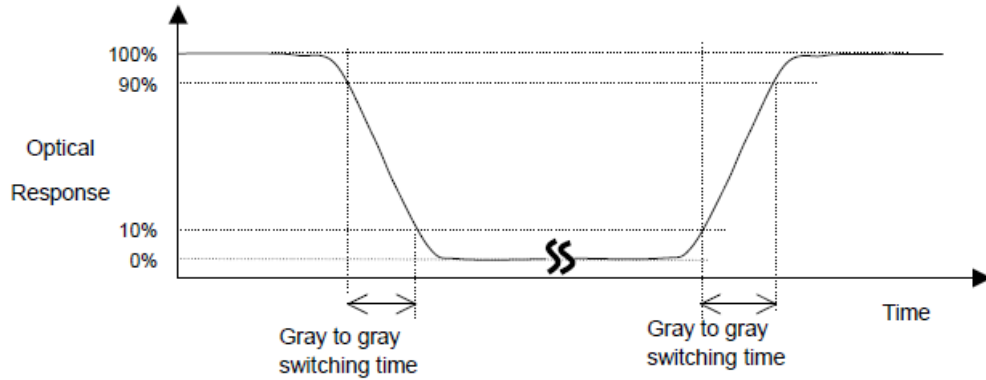
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA 210

Note 4: Definition of Response time

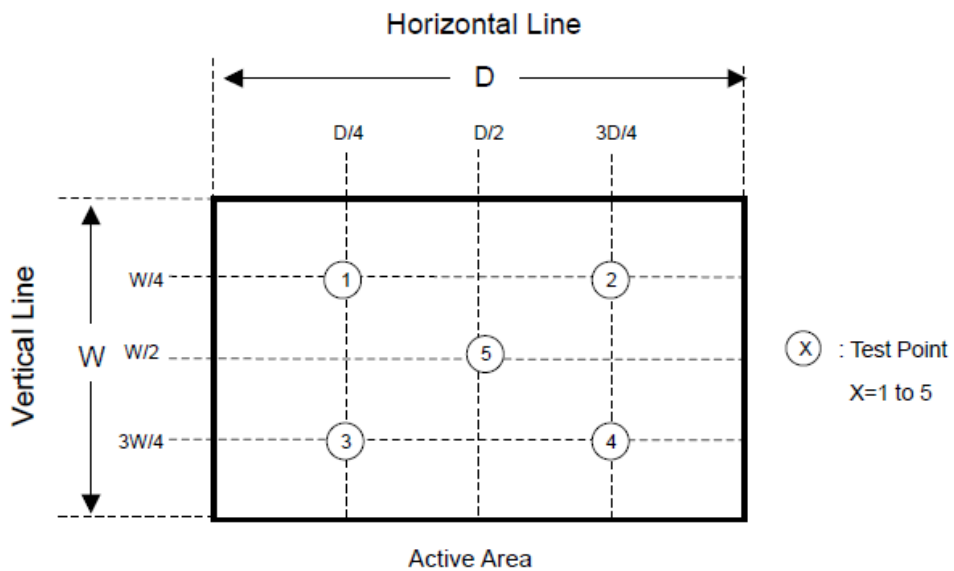
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as below.



Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA 210

Note 6: Center luminance is measured by Minolta CA 210

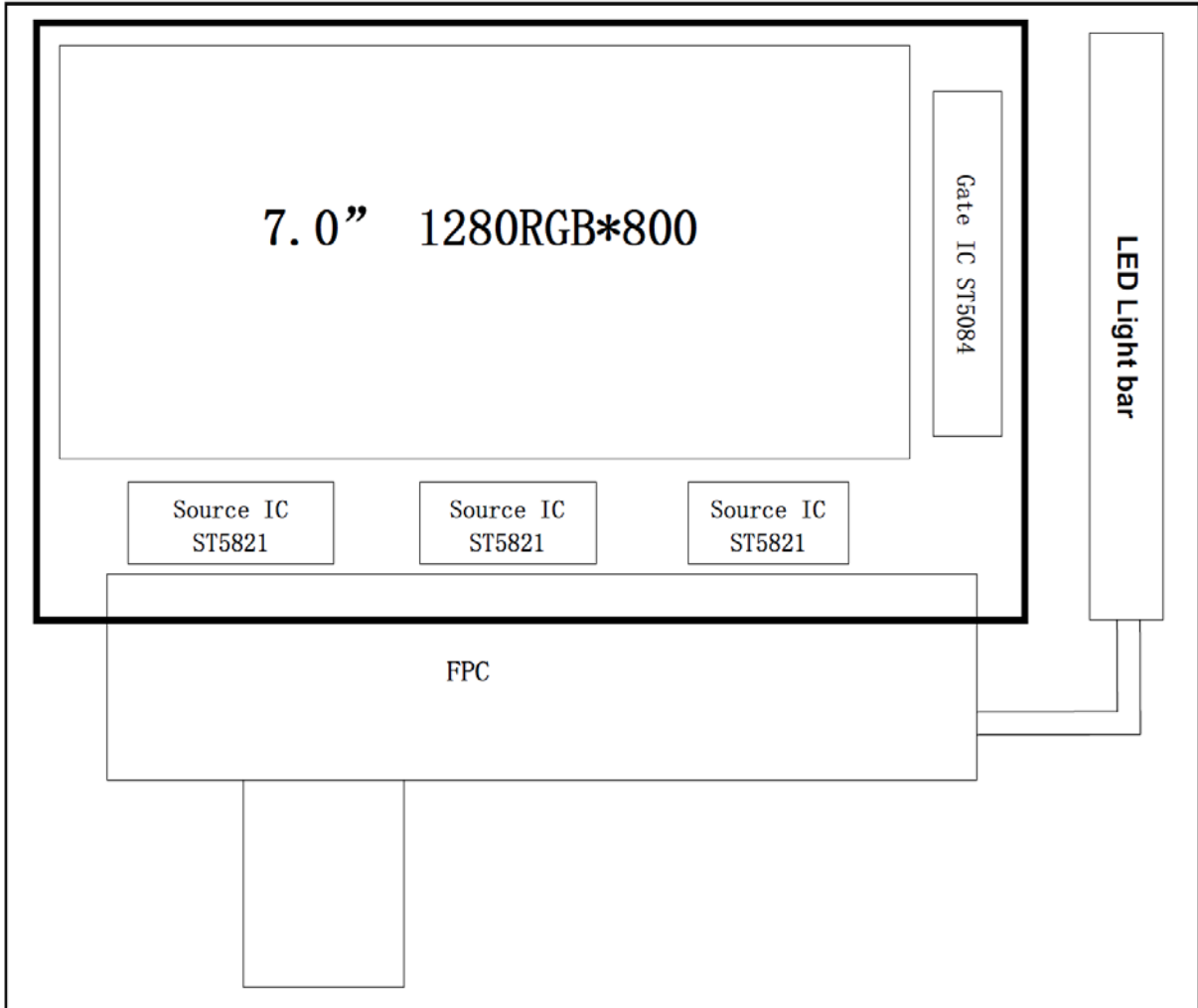
Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA 210



$$\text{Uniformity} = (\text{Min. Luminance of 5 points}) / (\text{Max. Luminance of 5 points})$$

### 3. Functional block diagram

The following diagram shows the functional block of the 7 inches color TFT-LCD module:



**4. Absolute Maximum Ratings**

Absolute maximum ratings of the module are as following:

4.1 TFT LCD module

GND=0V, Ta = 25°C

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VDD	-0.5	5.0	V	
	AVDD	-0.5	14.85	V	
	VGH	-0.3	20.0	V	
	VGL	-20.0	0.3	V	

4.2 Backlight Unit

Items	Symbol	Min	Max	Unit	Conditions
LED Current	I <sub>LED</sub>	--	480	mA	Note 1, 2

4.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T <sub>OP</sub>	-20	-	70	°C	Note 3
Operation Humidity	H <sub>OP</sub>	5		90	%	
Storage temperature	T <sub>ST</sub>	-30		80	°C	
Storage Humidity	H <sub>ST</sub>	5		90	%	

Note 1: With in Ta= 25°C

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to IIS (Incoming Inspection Standard).

**5. Electrical Characteristics**

5.1 TFT LCD module

5.1.1 Voltage characteristics

Ta = 25°C

Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Analog Supply Voltage	AVDD	10.5	11	11.5	V	
Gate On Voltage	VGH	17.5	18.0	18.5	V	
Gate Off Voltage	VGL	-7.1	-6.8	-6.5	V	

5.1.2 Current characteristics

Item	Min	Typ	Max	Unit	Remark
Ivdd	42.4	53	63.6	mA	
Iavdd	33.2	41.5	49.8	mA	
Ivgh	0.326	0.408	0.490	mA	
Ivgl	0.326	0.408	0.490	mA	

5.2 Interface connection

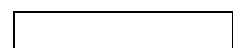
5.2.1 TFT LCD panel

Matching Connector type: Molex 54132-4062

Pin No.	Symbol	I/O	function	Remarks
1	NC	--	No connection	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	--	No connection	
5	NC	--	No connection	
6	NC	--	No connection	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	-LVDS differential data input	
12	RXIN1+	I	+LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	-LVDS differential data input	
15	RXIN2+	I	+LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	-LVDS differential clock input	
18	RXCLKIN+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	-LVDS differential data input	
21	RXIN3+	I	+LVDS differential data input	
22	GND	P	Ground	
23	NC	--	No connection	
24	NC	--	No connection	
25	GND	P	Ground	
26	NC	--	No connection	
27	NC	--	No connection	
28	NC	--	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	--	No connection	
34	NC	--	No connection	
35	VGL	P	Gate Off Voltage	
36	NC	--	No connection	
37	NC	--	No connection	
38	VGH	P	Gate On Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Note1: I/O definition.

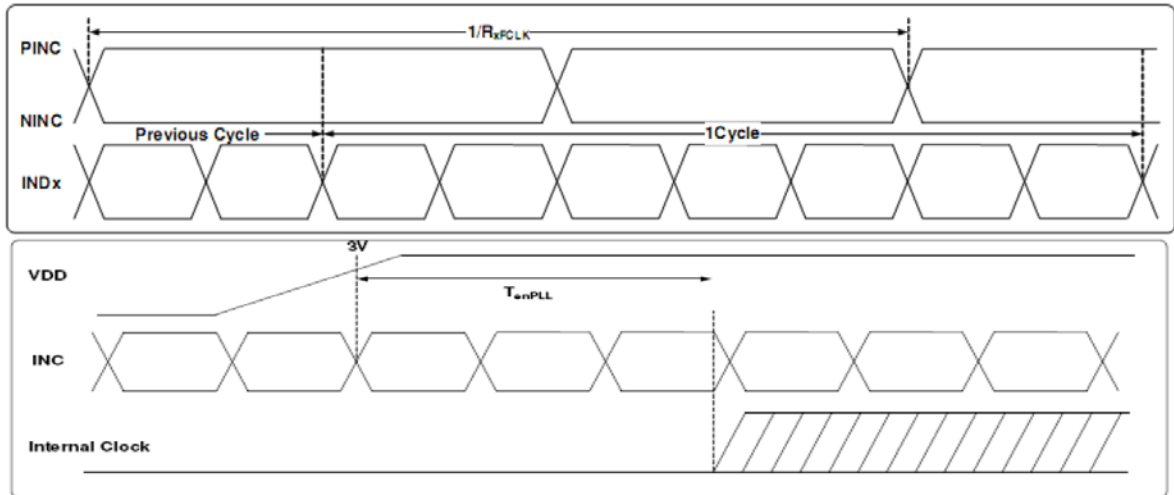
I---Input, O---Output, P--- Power/Ground, N--- No connection



5.3 Timing chart

5.3.1 AC electrical characteristics

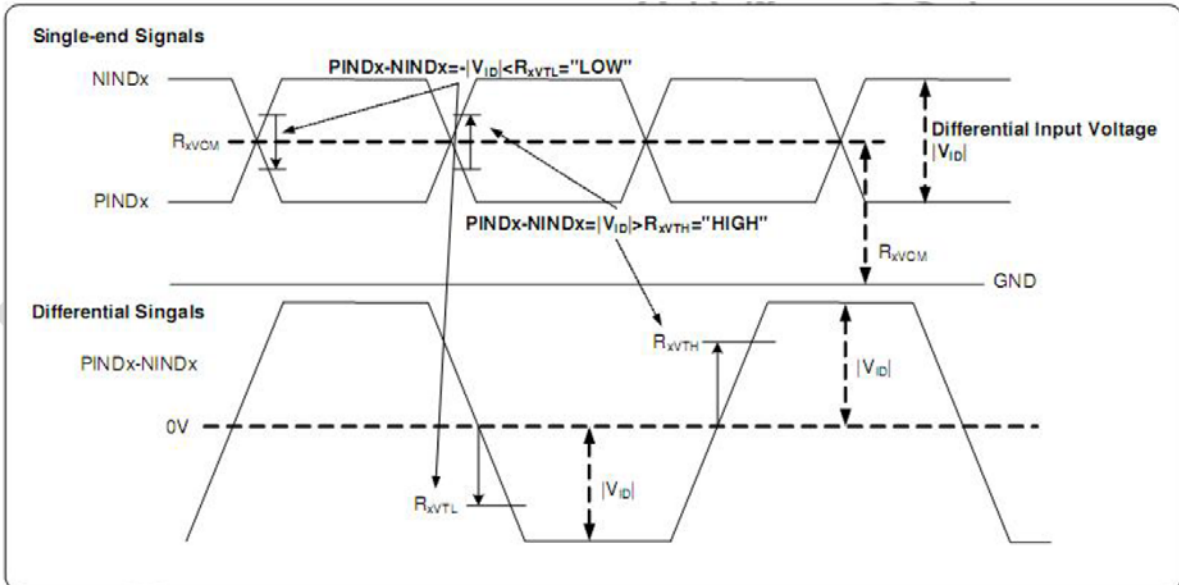
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Clock Frequency	$R_{xFCLK}$	20	-	80	MHz	
Input data skew margin	$T_{RSKM}$	500	-	-	ps	$ V_{IO}  = 400mV$ , $R_{xVCM} = 1.2V$ $R_{xFCLK} = 80MHz$
Clock high time	$T_{LVCH}$	-	4/7	-	$R_{xFCLK}$	
Clock low time	$T_{LVCL}$	-	3/7	-	$R_{xFCLK}$	
PLL wake-up time	$T_{enPLL}$	-	-	150	us	



5.3.2 DC electrical characteristics

VGH=18V, VGL=-6.8V, VDD=3.3V, GND=0V, Ta=25°C

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Differential input high Threshold voltage	$R_{XVTH}$	-	-	+0.1	V	
Differential input Low Threshold voltage	$R_{XVTL}$	-0.1	-	-	V	
Input voltage range	$R_{XVIN}$	0	-	VDD-1.0	V	
Differential input common Mode voltage	$R_{XVCM}$	$ V_{ID} /2$	-	$2.4 V_{ID} /2$	V	
Differential input voltage	$ V_{ID} $	0.2	--	0.6	V	
Differential input leakage Current	$R_{V_{XIZ}}$	-10	--	+10	uA	
LVDS Digital Operating Current	$I_{ddlvds}$	-	40	50	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	$I_{stlvds}$	-	10	50	uA	Clock & all functions are stopped





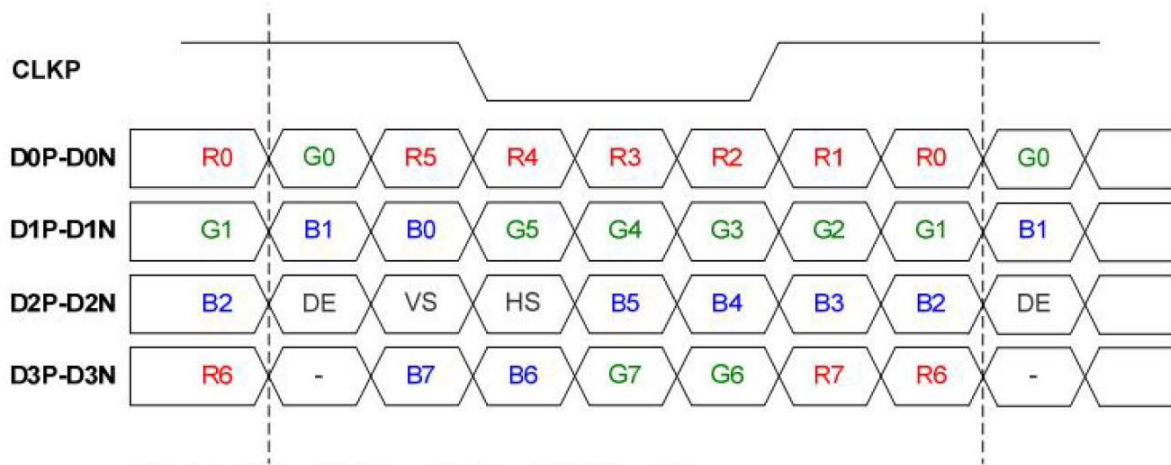
5.3.3 Input timing

1280x800 (RES[3:0] = 0010)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	$t_{CLK}$	62.6	68.2	78.1	Mhz	
Horizontal blanking time	$t_{HBT}$	20	69	164	$t_{CLK}$	$t_{HBP} + t_{HFP}$
Horizontal back porch	$t_{HBP}$	5	5	$164 - t_{HFP}$	$t_{CLK}$	
Horizontal display area	$t_{HD}$	1280	1280	1280	$t_{CLK}$	
Horizontal front porch	$t_{HFP}$	15	64	159	$t_{CLK}$	
Horizontal period	$t_H$	1300	1349	1444	$t_{CLK}$	
Horizontal pulse width	$t_{HPW}$	1	1	256	$t_{CLK}$	
Vertical blanking time	$t_{VBT}$	5	42	101	$t_V$	$t_{VBP} + t_{VFP}$
Vertical back porch	$t_{VBP}$	2	2	$101 - t_{VFP}$	$t_V$	
Vertical display area	$t_{VD}$	800	800	800	$t_V$	
Vertical front porch	$t_{VFP}$	3	40	99	$t_V$	
Vertical period	$t_V$	803	842	901	$t_V$	
Vertical pulse width	$t_{VPW}$	1	1	128	$t_V$	

5.3.4 Data input format

VESA data mapping

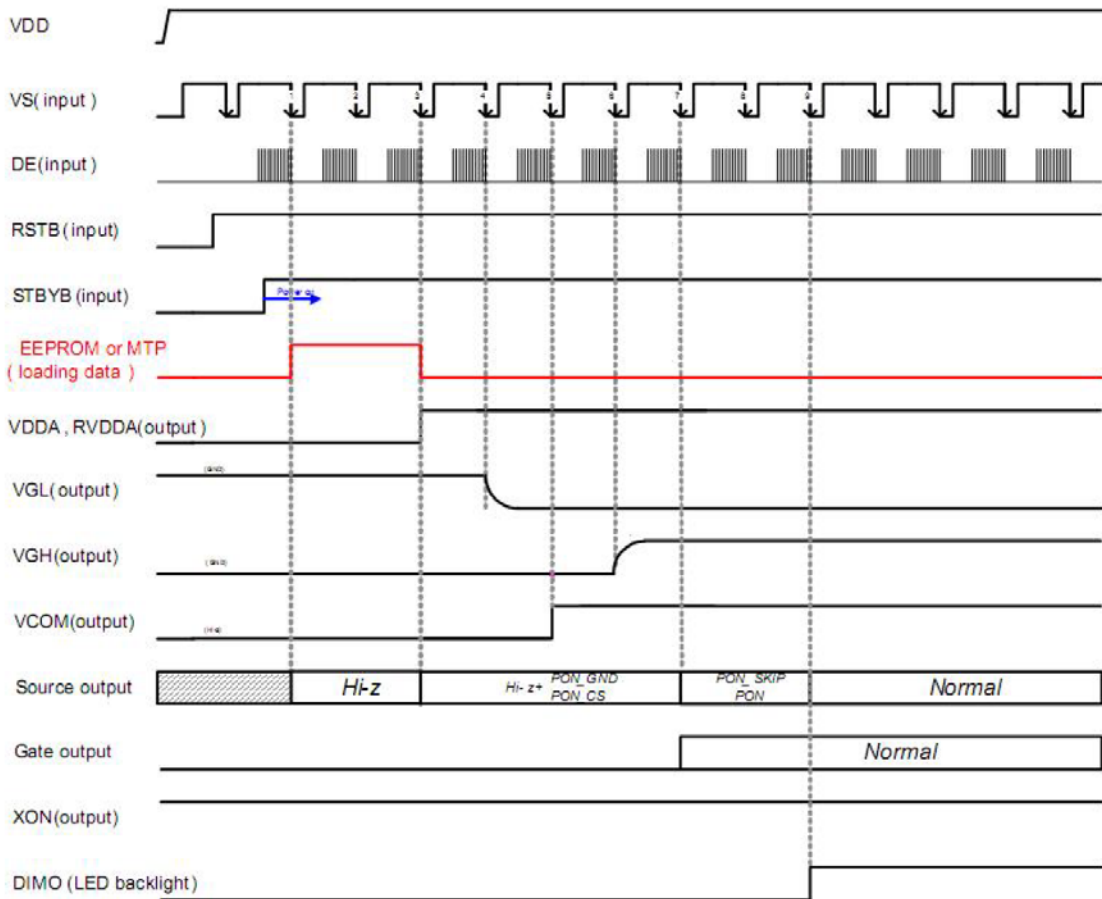


Note 1 : for 6 bit mode, MSB are R/G/B[5] and R/G/B[0] are LSB  
 Note 2 : for 8 bit mode, MSB are R/G/B[7] and R/G/B[0] are LSB

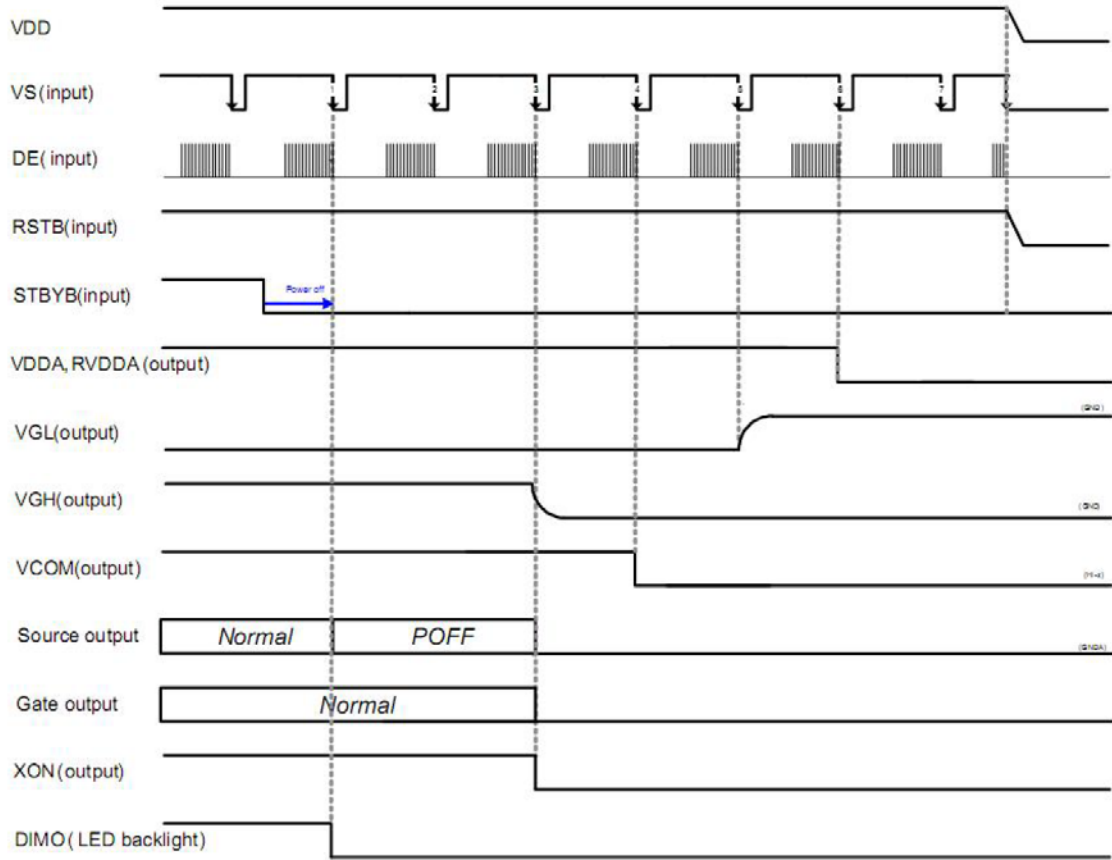
5.3.5 Power ON/OFF timing

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

Power ON:



Power Off:



## 5.4 Backlight specification

Parameter guideline is under stable conditions at 25°C (Room Temperature):

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		18		[V]	2
LED current (IL)		210		[mA]	2,
LED Power (PL)		3.78		[W]	
LED Life Time(LTLED)		100,000		[Hour]	1

Note 1: The “LED lift time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C and typical LED Current at 210 mA

Note 2: The variance of LED Light Bar power consumption is ±10%. Calculator value for reference ( $IL \times VL = PLED$ )

**6. Reliability Test**

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 40°C, 90%RH, 120hours	
High Temperature Operation (HTO)	Ts= 70°C, 120hours	3
Low Temperature Operation (LTO)	Ta= -30°C, 120hours	4
High Temperature Storage (HTS)	Ta= 80°C, 120hours	
Low Temperature Storage (LTS)	Ta= -30°C, 120hours	
Thermal Shock Test (TST)	-10°C/30min, 60°C/30min, 20 cycles	1
On/Off Test	On/10sec, Off/10sec, 3,000 cycles	2
ESD (ElectroStatic Discharge)	C=150pF, R=330Ω, 5point/panel Air: ±8Kv, 5times; Contact: ±4Kv, 5times (Environment: 15°C~35°C, 30%~60%. 86Kpa~106Kpa)	2

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20°C to 60°C, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: TFT surface

Note 4: There should be no condensation on the surface of panel during test.

Note 5: In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

Note 6: Before cosmetic and function test, the product must have enough recovery time, at least 4 hours at room temperature.

**7. Shipping package**  
**TBD**

**8. Mechanical Characteristics**

