

17.0" SXGA**High brightness color TFT-LCD module****Model: VM17B4 V1****Date: Jul. 20th, 2020**

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

Customer : _____**Date :** _____**Approved****Prepared****Date:****Date:**

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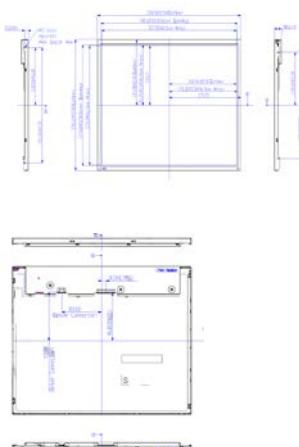
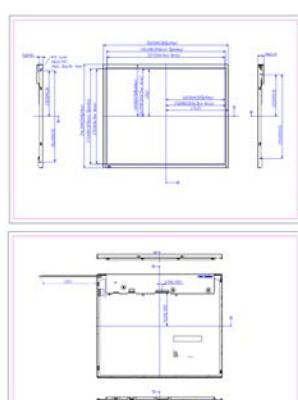
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RECORD OF REVISION

Version and Date	Page	Old description	New description	Remark
0.1 2012/06/16	All	First Edition for customer		
0.2 2014/04/20			Typical 700 nits brightness	
0.3 2020/07/20	6 14 23	Power : 23.8W LED voltage : 37.2V	Power : 18.75W LED voltage : 27V Drawing updated	 

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) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 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

This 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 SXGA (1280(H) x 1024(V)) screen and 16.7M colors.

2.2 Features

- High brightness display, 700nits by LED backlight.
- Extra wide operation temperature
- Long operation lifetime BLU design
- RoHS Compliance

2.3 Application

Industrial applications.

2.4 Display specifications

Items	Unit	Specification
Screen Diagonal	mm	17.0
Active Area	mm	337.92 (H) X 270.336 (V)
Pixels H x V	pixels	1280 x3(RGB) x 1024
Pixels Pitch	um	264 (per one triad) x 264
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally Black
White luminance (center)	Cd/m ²	700 (Typ)
Contrast ratio		800:1 (Typ.)
Optical Response Time	msec	30 ms (Typ. On/off)
Normal Input Voltage VDD	Volt	5.0
Power Consumption (Vcc Line + LED backlight)	Watt	18.75W (VDD line=5.25 W; LED lines= 13.5 W)
Weight	Grams	1800
Physical size	mm	358.5 (W) x 296.5 (H) x 18.0 (D)
Electrical Interface		2-ch LVDS
Support colors		16.7M colors
Surface Treatment		Anti-glare and hard-coating 3H
Temperature range		
Operating	°C	-30 ~ 85 (TFT surface)
Storage	°C	-30 ~ 85
RoHS Compliance		RoHS Compliance

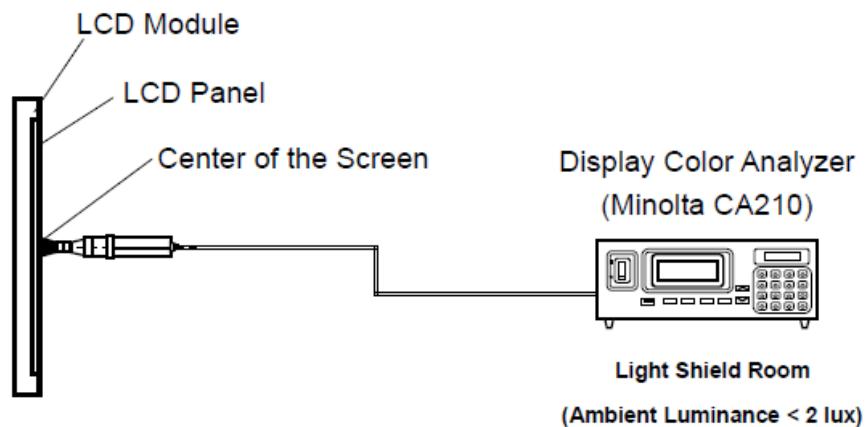
2.5 Optical characteristics

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

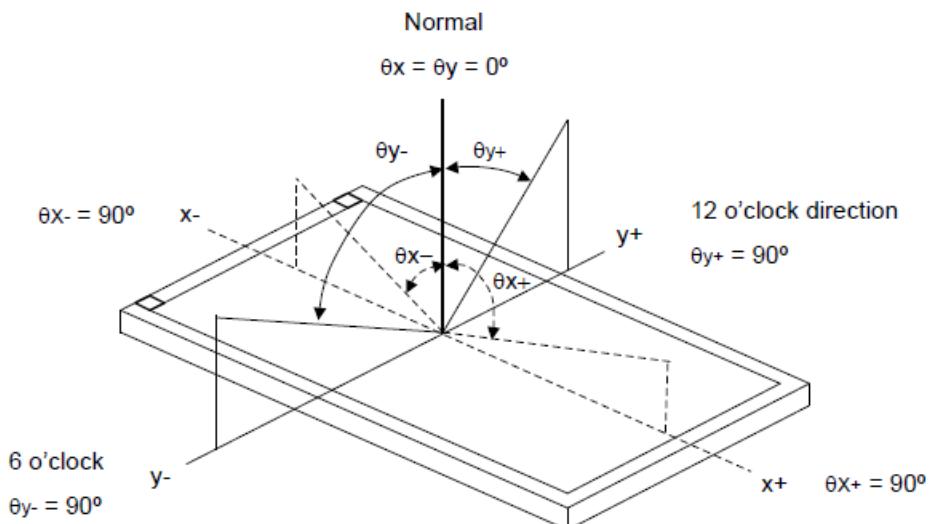
Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	75	85		2
		CR=10 (Left)	75	85		
		Vertical (Up)	70	80		
		CR=10 (Down)	70	80		
Contrast Ratio		Normal Direction	600	800		3
Response Time	msec	Raising + Falling		30	40	4
Color / Chromaticity Coordinates (CIE)		Red x		0.648		5
		Red y		0.339		
		Green x		0.323		
		Green y	-0.05	0.613	+0.05	
		Blue x		0.143		
		Blue y		0.070		
Color coordinates (CIE) White		White x		0.313		
		White y		0.329		
Center Luminance	Cd/m ²			700		6
Luminance Uniformity	%		70	75		7
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

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.



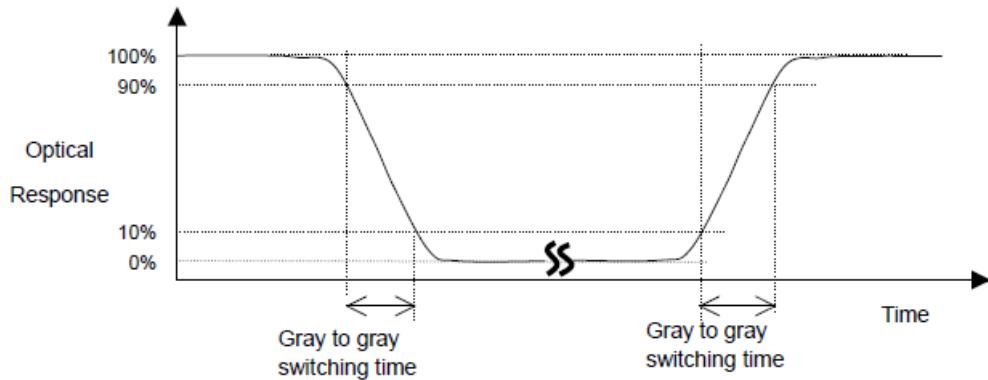
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

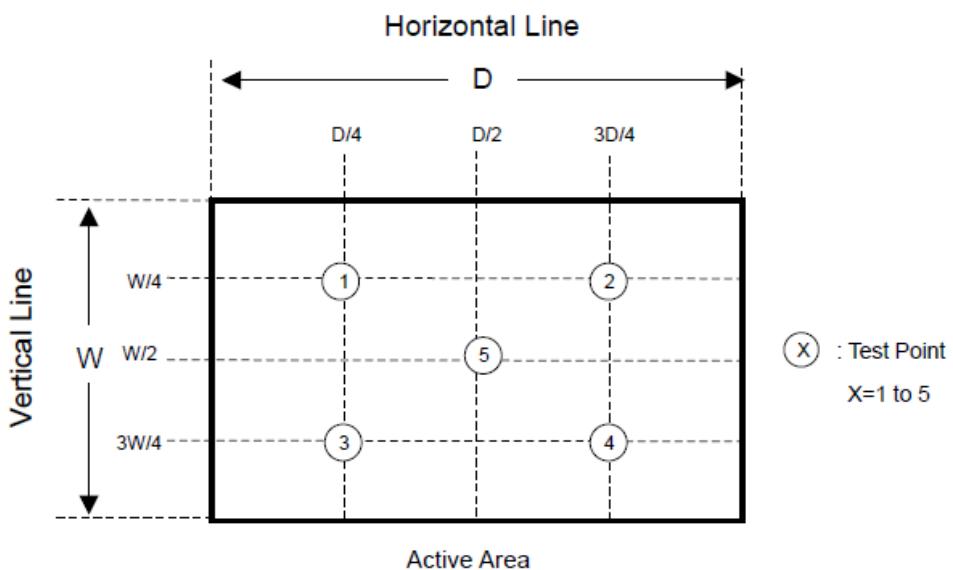
The output signals of photo detector are measured when the input signals are changed from "Full Black" to "Full White" (rising time), and from "Full White" to "Full Black" (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as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



Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA210

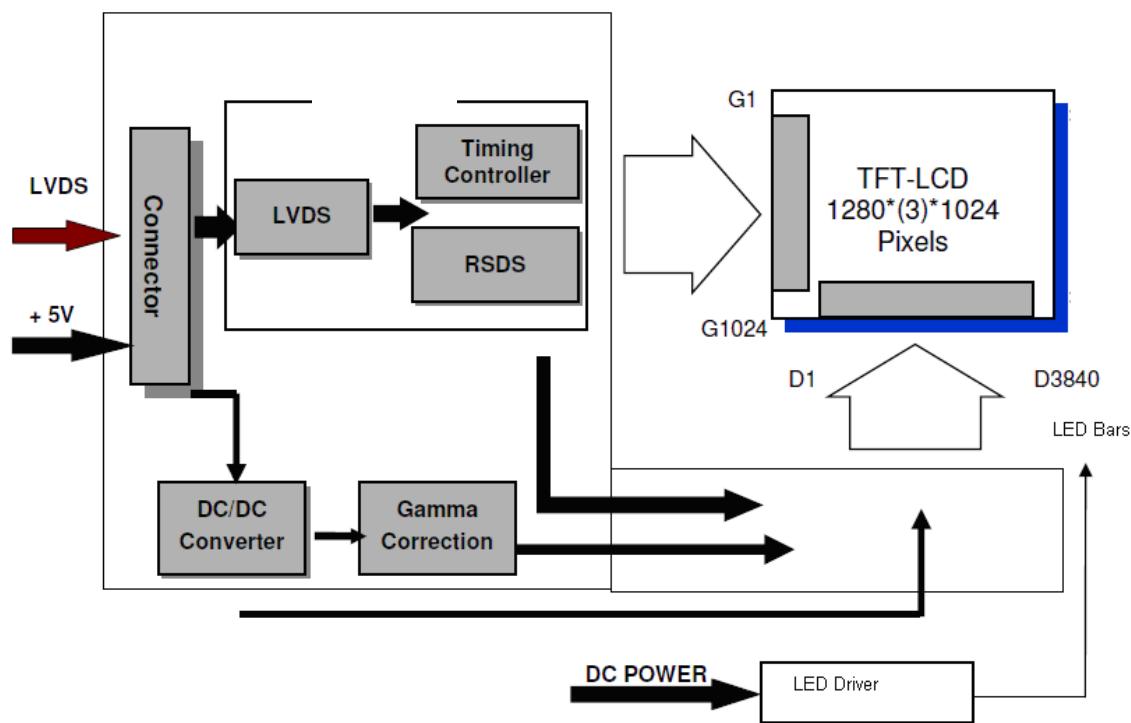
Note 6: Center luminance is measured by Minolta CA210

Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210



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

3. Function block diagram

**PCBA Connector:**

JAE FI-XB30SSL-HF15

Or Compatible

4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD module

Items	Symbol	Min	Max	Unit	Conditions
Power supply voltage	V_{DD}	-0.3	6.0	Volt	Note 1, 2

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED bar input current			720	mA	

4.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OS}	-30	-	85	°C	Note 3
Operation Humidity	H_{OP}	10		85	%	
Storage temperature	T_{ST}	-30		85	°C	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in $T_a = 25^\circ\text{C}$

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

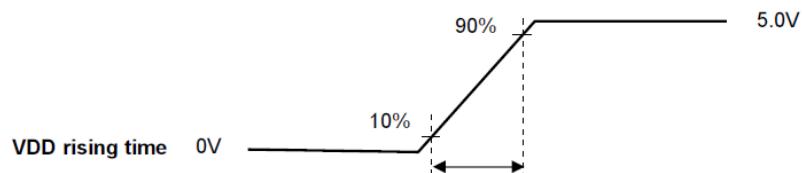
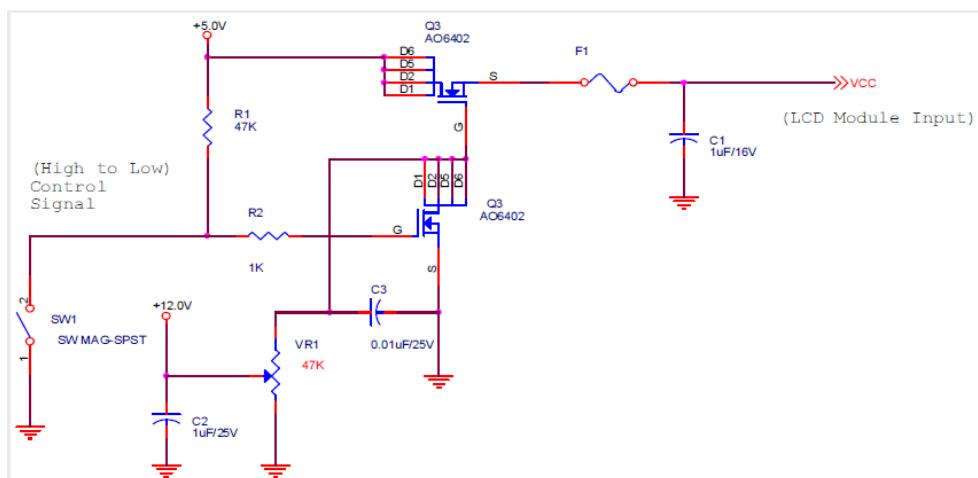
5.1 LCD electronics specification

5.1.1 Power specification

Input power specifications are as follows:

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
VCC	Logic/LCD Drive Voltage	4.5	5.0	5.5	[Volt]	±10%
ICC	Input Current	-	1.05	1.16	[A]	Vin=5V , All Black Pattern, at 75Hz
IRush	Inrush Current	-	-	3.0	[A]	Note
PCC	VCCPower	-	5.25	5.8	[Watt]	Vin=5V , All Black Pattern, at 75Hz
VCCrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	200	[mV] p-p	With panel loading

Note: Measurement conditions:



5.1.2 Signal electrical characteristics

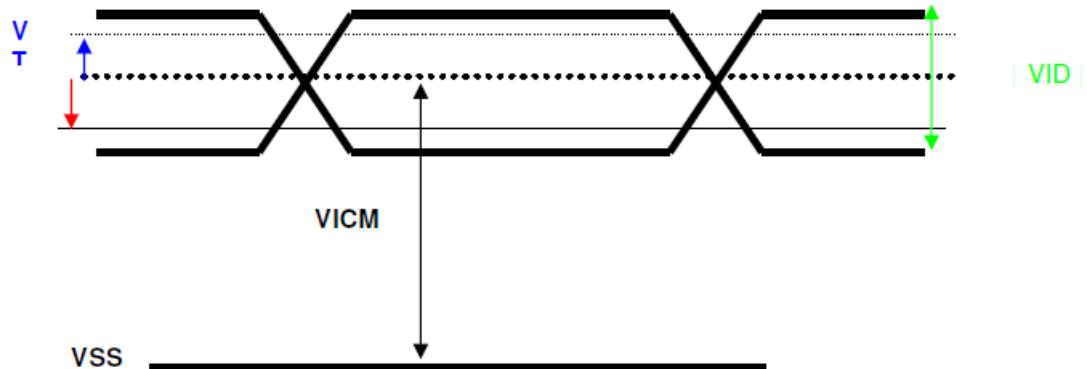
Input signals shall be low or Hi-Z state when Vin is off

It is recommended to refer the specifications of SN75LVDS82DGG (Texas Instruments) in detail.

Characteristics of each signal are as following:

Symbol	Parameter	Min	Typ	Max	Unit	Condition
VTH	Differential Input High Threshold			+100	mV	VICM = 1.2V
VTL	Differential Input Low Threshold	-100			mV	VICM = 1.2V
VID	Input Differential Voltage	100	400	600	mV	
VICM	Differential Input Common Mode Voltage	+1.0	+1.2	+1.5	V	VTH/VTL = 100mV

Note: LVDS Signal Waveform.



5.2 Backlight unit

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		27		[V]	2
LED current (IL)		500		[mA]	2,
LED Power (PL)		13.5		[W]	
LED Life Time(LTLED)		50,000		[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 500 mA

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

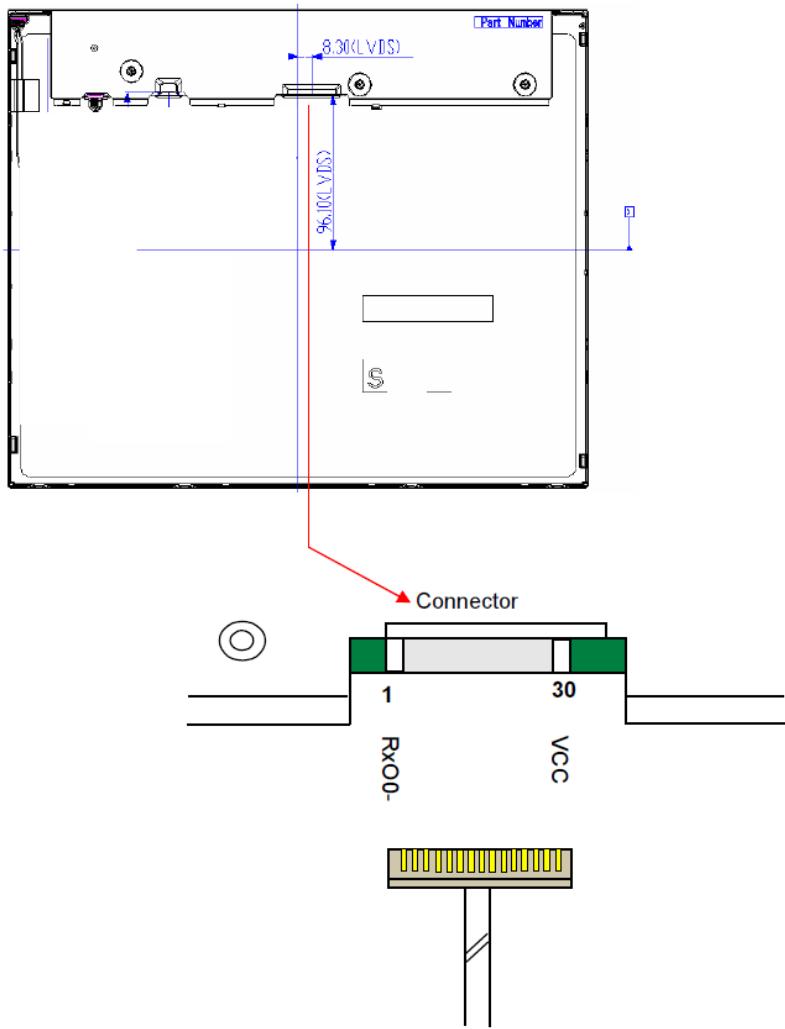
5.3 Interface connector

5.3.1 TFT connector(CN1)

The module using a pair of LVDS receiver SN75LVDS82(Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. Transmitter shall be SN75LVDS83(negative edge sampling) or compatible. The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

PIN #	SIGNAL NAME	DESCRIPTION
1	RxO0-	Negative LVDS differential data input (Odd data)
2	RxO0+	Positive LVDS differential data input (Odd data)
3	RxO1-	Negative LVDS differential data input (Odd data)
4	RxO1+	Positive LVDS differential data input (Odd data)
5	RxO2-	Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
6	RxO2+	Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RxOC-	Negative LVDS differential clock input (Odd clock)
9	RxOC+	Positive LVDS differential clock input (Odd clock)
10	RxO3-	Negative LVDS differential data input (Odd data)
11	RxO3+	Positive LVDS differential data input (Odd data)
12	RxE0-	Negative LVDS differential data input (Even data)
13	RxE0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxE1-	Negative LVDS differential data input (Even data)
16	RxE1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RxE2-	Negative LVDS differential data input (Even data)
19	RxE2+	Positive LVDS differential data input (Even data)
20	RxEC-	Negative LVDS differential clock input (Even clock)
21	RxEC+	Positive LVDS differential clock input (Even clock)
22	RxE3-	Negative LVDS differential data input (Even data)
23	RxE3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	GND	Power Ground (For AUO test Aging+HVS mode)
26	NC	No contact
27	GND	Power Ground
28	VCC	+5.0V Power Supply
29	VCC	+5.0V Power Supply
30	VCC	+5.0V Power Supply

Note1: Start from left side



Note2: Input signals of odd and even clock shall be the same timing.

Note3: Please follow PSWG.

5.3.2 Backlight connector(CN2)

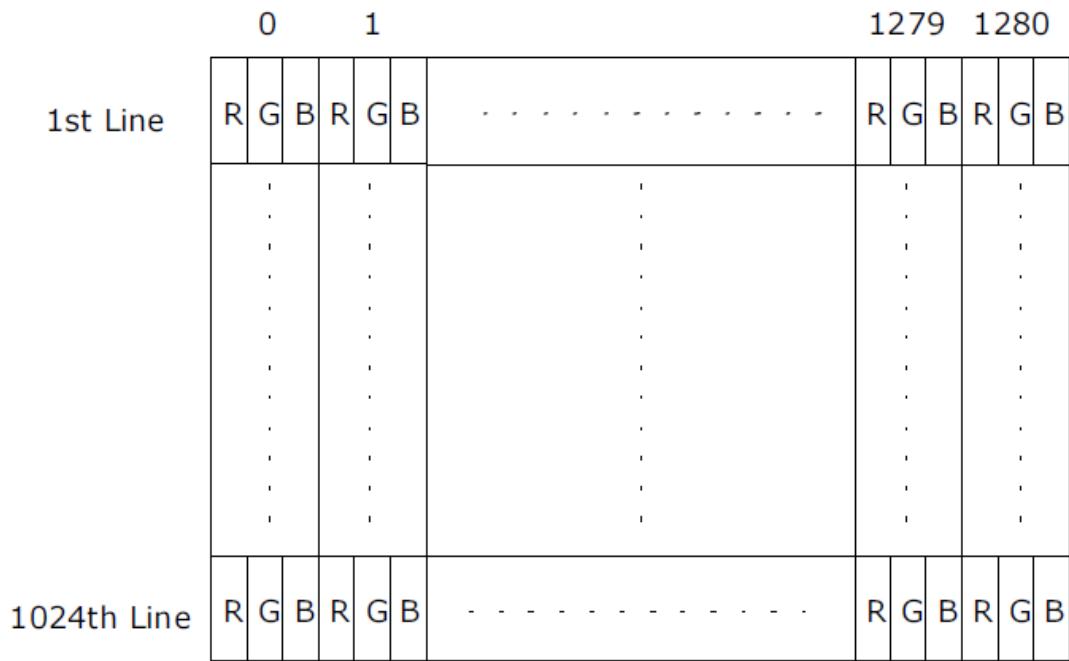
Recommended connector : JOIN TEK JT1025-1021 (BHSR-02VS-1 manufactured by JST)

Pin no	Symbol	I/O	Description	Remark
1	VLED+	P	Backlight LED anode	
2	VLED-	P	Backlight LED cathode	

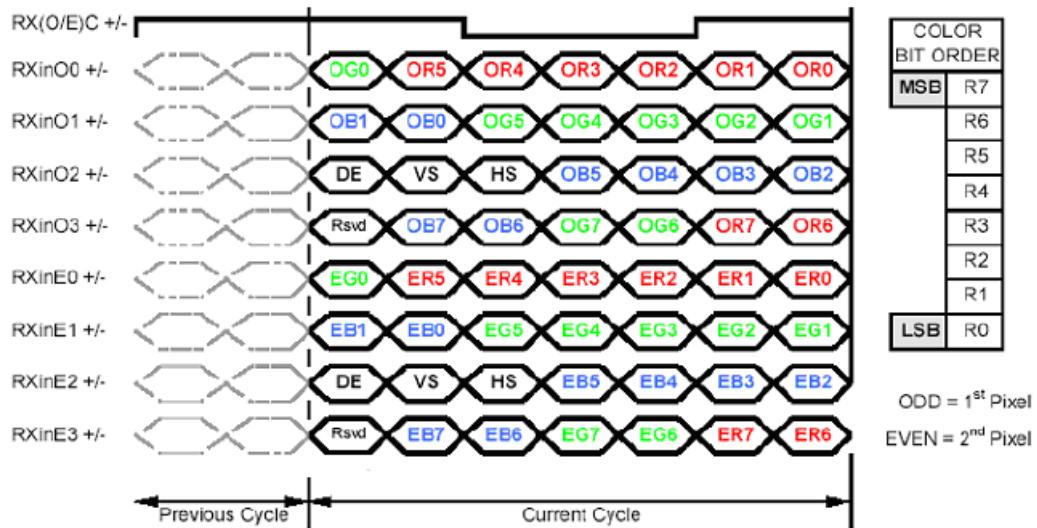
6 Signal characteristics

6.3 Pixel format image

Following figure shows the relationship of the input signals and LCD pixel format.



6.4 The input data format



Note1: Normally, DE, VS, HS on EVEN channel are not used.

Note2: Please follow PSWG.

Note3: 8-bit in

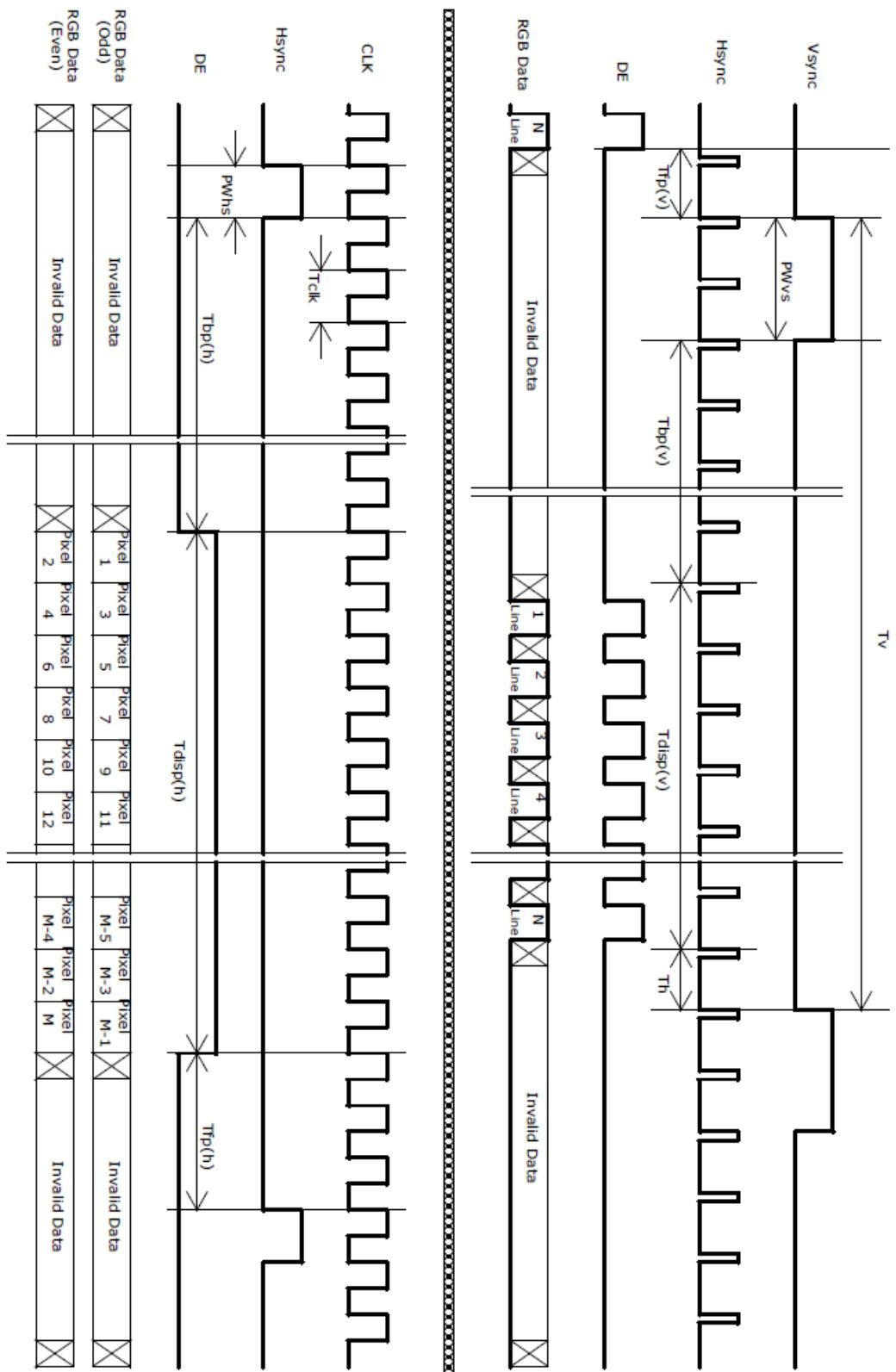
6.5 Timing characteristics

Basically, interface timings described here is not actual input timing of LCD module but output timing of SN75LVDS82DGG (Texas Instruments) or equivalent.

Signal	Item	Symbol	Min	Typ	Max	Unit
Vertical Section	Period	T_v	1034	1066	2048	Th
	Active	$T_{disp(v)}$	1024	1024	1024	Th
	Blanking	$T_{bp(v)}+T_{fp(v)}+PW_{vs}$	10	42	1024	Th
Horizontal Section	Period	T_h	740	844	2048	Tclk
	Active	$T_{disp(h)}$	640	640	640	Tclk
	Blanking	$T_{bp(h)}+T_{fp(h)}+PW_{hs}$	100	204	1408	Tclk
Clock	Period	T_{clk}	14.81	18.52	-	ns
	Frequency	$Freq$	40	54	70	MHz
Frame rate	Frame rate	F	49	60	76	Hz

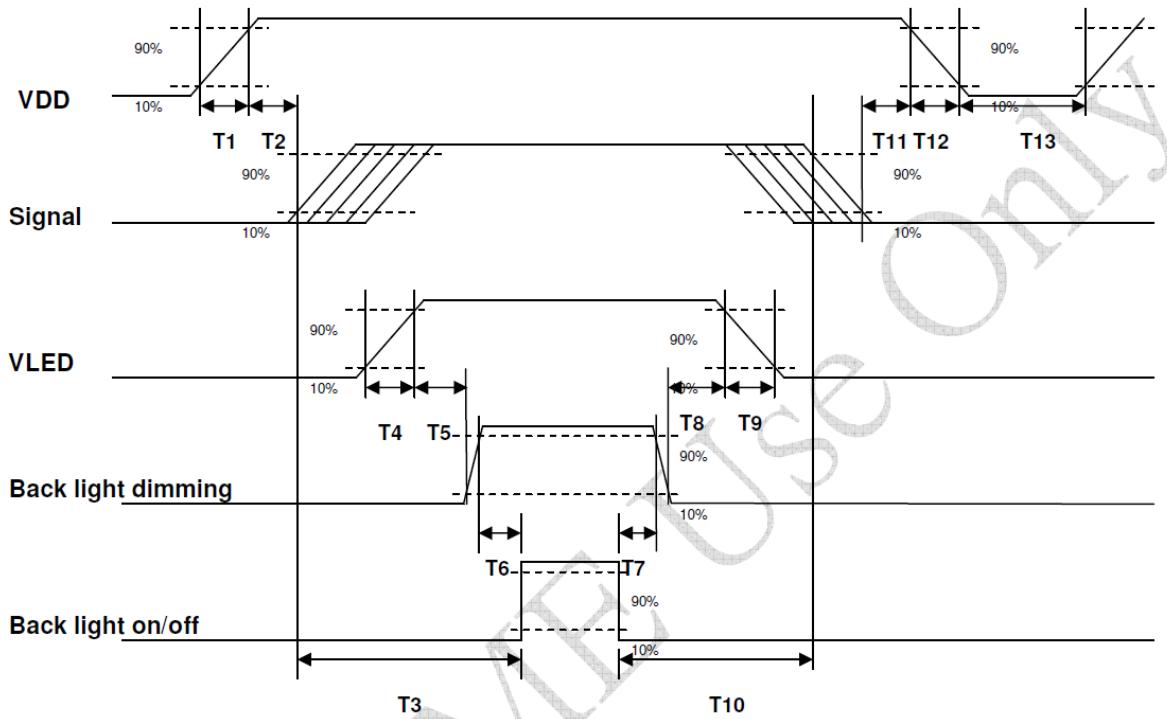
Note: DE mode.

6.6 Timing diagram



6.7 Power ON/OFF sequence

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	0.5	-	10	[ms]
T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	0	-	-	[ms]
T8	10	-	-	[ms]
T9	-	-	10	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

Note: The values of the table are follow PSWG.

7 Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta=40°C, 80%RH, 240hours	
High Temperature Operation (HTO)	Ts= 85°C, 240hours	3
Low Temperature Operation (LTO)	Ta= -30°C, 240hours	
High Temperature Storage (HTS)	Ta= 85°C, 240hours	
Low Temperature Storage (LTS)	Ta= -30°C, 240hours	
Thermal Shock Test (TST)	-20°C/30min, 60°C/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point.	
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point.	

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 -10°C to 50°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.

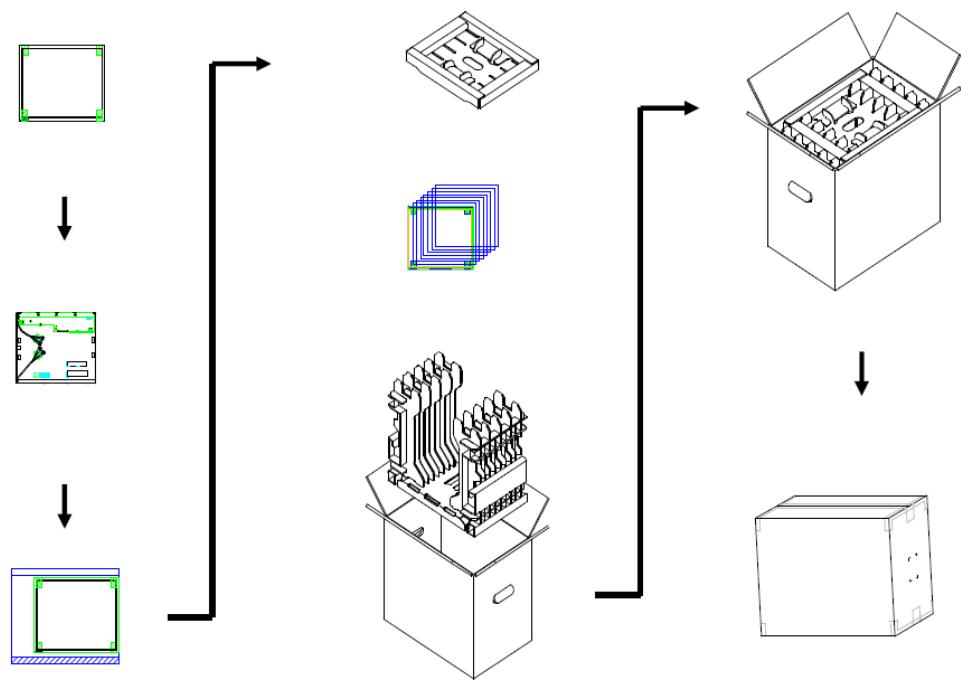
Note 3: TFT surface.

8 Shipping package

Max capacity : 8 TFT-LCD module per carton

Max weight: 14 kg per carton

Outside dimension of carton:426(L)mm*270(W)mm*375(H)mm



9. Mechanical Characteristics

