倍顯(香港)有限公司
Facelcd(HongKong) Limited

Product Specification

10.1" TFT LCD Module

Model No :	**FB101MFV600-A**
Resolution:	**1280*720**
Interface:	**LVDS**
Luminance :	**500cd/m² (typ)**

■ **Tentative Specification**
☐ **Preliminary Specification**
☐ **Approval Specification**

APPROVED		
Designed by	**Checked by**	**Approved by**

CUSTOMER APPROVED		
Prepared by	**Checked by**	**Approved by**

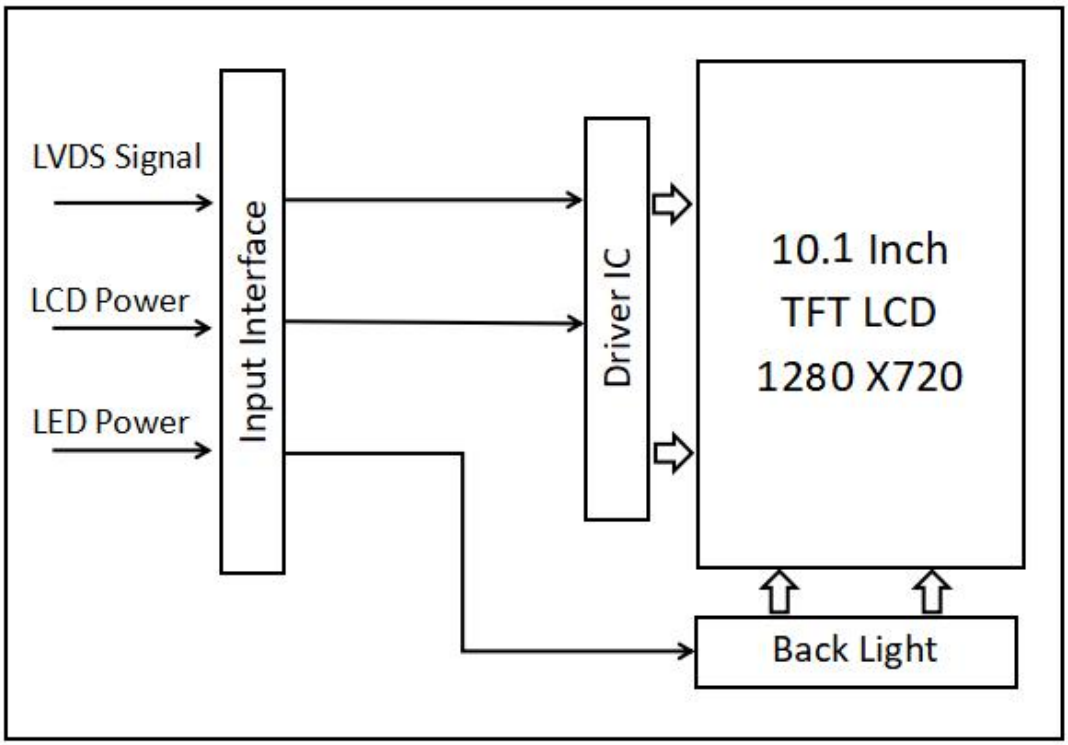
Revision History

Version	Contents	Date	Note
V0	Original	2023.07.24	-

Contents

1.General Description

The LCM **FB101MFV600-A** is a color active matrix thin filmtransistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device.



2. Mechanical Specifications

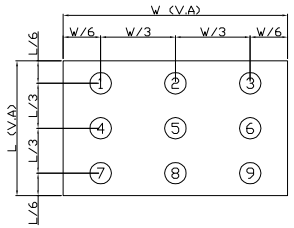
No.	Item	Specification
1	LCD Type	10.1 inch
2	Resolution	1280(RGB)X720
3	Display mode	Normally Black
4	Outline size (mm)	235.00(H) x 143.00(V) x 4.80(body)
5	Active area (mm)	224.64(W) x126.36(H)
5	Pixel pitch (mm)	0.1755(H) x 0.1755(V)
6	Viewing direction	ALL
7	Display Color	16.7M
8	Surface Treatment	AG
9	Interface	LVDS
10	Brightness	500cd/㎡(typ)
11	Driver IC	EK79202

第三角法	DATE 日期	2023-7-17	PAGE 页数	1/1

MARK	REV.	REASON FOR CHANGE	CHANGE CONTENT	REVISER	DATE
	A0		首次出图	MHz	2023-7-17

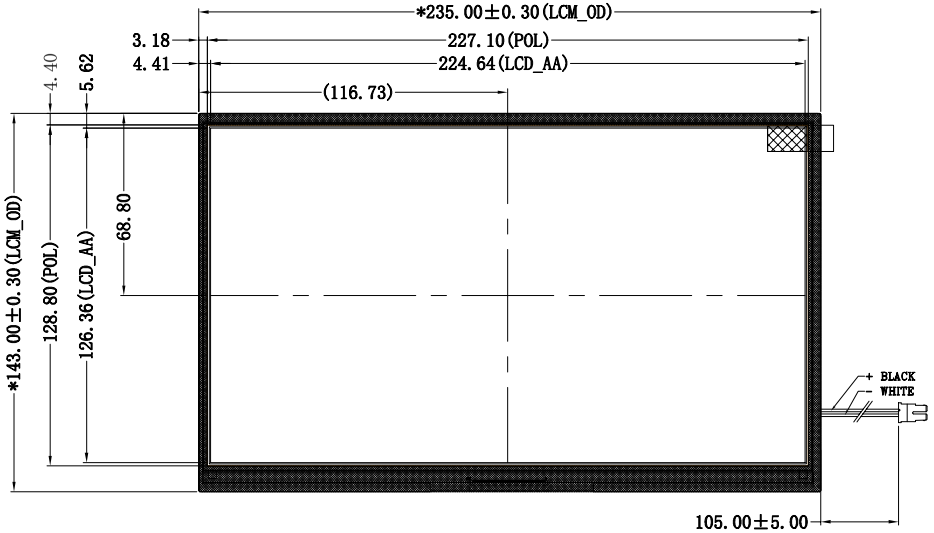
亮度测试点分布示意图

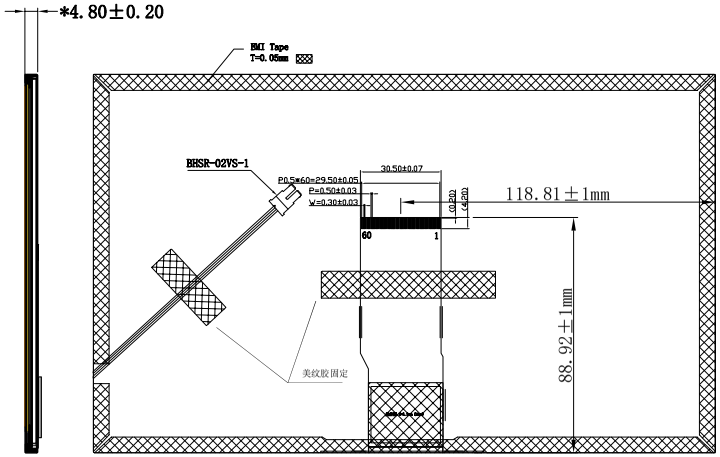
LIGHT SOURCE
光源方向



光学视区测试点分布9点

测试距离：50±5cm，测试角度：1°
均匀性=最小/最大亮度*100%，测试仪器:BM-7

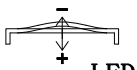




平坦度标准（塞规测量）

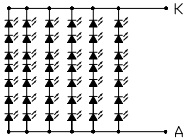
TOLERANCE	
MAX	0.5

TOLERANCE	
MAX	0



背光电路图：

LED 7串6并



LED_电路图
270MA,21V

1.说明：
2.单位：mm 未注公差为：L/W±0.2 H±0.2
3.测试规则遵守右图所示：
4.使用BM-7亮度色度仪测量。测量高度是500mm。角度为1度。
5.铁框背面：不能存在明显的刮伤\压印线不良现象
6.所有未注圆角尺寸为R0.30,变形度管控在参考上表.
7.所有的零部件表面必须为绝缘材料(如FPC, LED)
8. "⚠"为变更标记,"( )"为参考尺寸," * "为重点尺寸,
"CPK"为CPK尺寸，标准: Cpk>=1.33.

11.电光特性

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 (中心点亮度)	Lv	—	—	—	cd/m²	(BM-7测试值) 高度：50±5cm 测试角度：1°
	Luminance (9点平均)	Lv				cd/m²	
	Uniformity(9点均匀性)	Avg			—	%	
	hotspot(9点均匀性)	Avg	—	—	—	%	测试角度：0.2°
	Colour Coordinate (色坐标中心点)	X	0.265	0.295	0.325	—	(照度计测试值) Lv=xxxxmcd
		Y	0.275	0.305	0.335	—	
		9点色差		—		—	
Main screen 主屏 (LCM)	Luminance(亮度) (中心点)	Lv	450	500	—	cd/m²	If= 270 mA (定电流测试)
	Uniformity(均匀性) (整TAB)	Avg	70	75		%	
	Colour Coordinate (色坐标)(整TAB)	X	—	—	—		
		Y	—	—	—		
Forward Voltage(正向电压)		Vf		21.0		V	
Reverse Current(反向电流)		Vf	—	—	—		

CUSTOMER Approver 客户承认		CUSTOMER'S NAME 客 户 名 称		DESIGN 设 计	
CUSTOMER'S CODE 客户型号			EDITION 版 本		CHECK 审 核
Supplier'S CODE 供应商型号	FB101MFV600-A		EDITION 版 本	A0	REVIEW 批 准

由 Autodesk 教育版产品制作

4.Interface Assignment

Pin No.	Symbol	Description	Remark
1	AGND	Ground	
2	AVDD(NC)	No connection	
3	DVDD	Power for Digital Circuit	
4	GND	Ground	
5	VCOM(NC)	No connection	
6	DVDD	Power for Digital Circuit	
7	GND	Ground	
8	SCL	Serial communication clock input	
9	SDA	Serial communication data input	
10	CSB	Serial communication enables	
11	DVCOM-WP	Ground	
12	NC	No connection	
13	NC	No connection	
14	NC	No connection	
15	GND	Ground	
16	NC	No connection	
17	GND	Ground	
18	RXIN3+	Positive LVDS differential data inputs	
19	RXIN3-	Negative LVDS differential data inputs	
20	GND	Ground	
21	RXCLKIN+	Positive LVDS differential data inputs	
22	RXCLKIN-	Negative LVDS differential clock inputs-	
23	GND	Ground	
24	RXIN2+	Positive LVDS differential data inputs	
25	RXIN2-	Negative LVDS differential data inputs	
26	GND	Ground	
27	RXIN1+	Positive LVDS differential data inputs	
28	RXIN1-	Negative LVDS differential data inputs	
29	GND	Ground	
30	RXIN0+	Positive LVDS differential data inputs	
31	RXIN0-	Negative LVDS differential data inputs	
32	GND	Ground	
33	GND-LVDS	Ground	
34	RESET	Global reset pin	
35	STBYB	Standby mode,normally pull high	
36	L/R	Left / right selection	
37	DVDD	Power for Digital Circuit	
38	U/D	Up/down selection	
39	AGND	Ground	
40	AVDD(NC)	No connection	
41	VCOM(NC)	No connection	
42	DITHB	Dithering function enable control	
43	GND	Ground	
44	DVDD	Power for Digital Circuit	
45	GND	Ground	
46	NC	No connection	
47	NC	No connection	
48	NC	No connection	
49	NC	No connection	
50	NC	No connection	
51	NC	No connection	

52	NC	No connection	
53	GND	Ground	
54	DVDD	Power for Digital Circuit	
55	SELB	6bit/8bit mode select	
56	VGH	Gate ON Voltage	
57	DVDD	Power for Digital Circuit	
58	VGL	Gate OFF Voltage	
59	GND	Ground	
60	NC	No connection	

5. Operation Specifications

5.1 Absolute Max. Rating

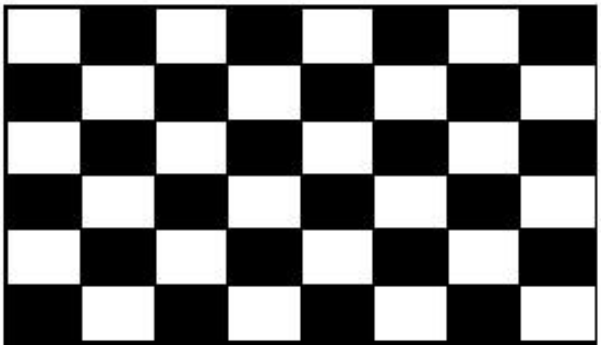
Item	Symbol	Values		Unit
		Min.	Max.	
Power Voltage	VCC	-0.3	3.6	V
Input Signal Voltage	V_I	-0.3	VDD	V
Operation Temperature	T_{OP}	-30	85	℃
Storage Temperature	T_{ST}	-40	90	℃

5.2 Typical Operation Conditions

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power Voltage	DVDD	3.0	3.3	3.6	V
	VGH		17.5		
	VGL		-12		
Current Consumption	I_{VDD}	-	-	-	mA
Power Consumption	P_{VDD}	-	-	-	W
	P_{LED}	-	-	-	W

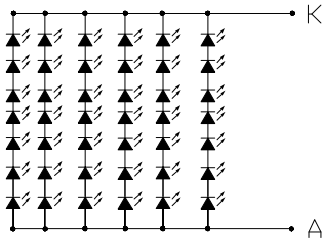
Note :1. The measuring position is the connector of LCM and the test conditions are under 25℃, Frame Rate=60Hz

2. The specified current and power consumption are under the VCC = 3.3V , 25℃, Frame Rate=60Hz condition and Mosaic pattern，The LED driving condition is ILED=270mA.



5.3 LED Back Light Specification

Item	Symbol	Condition	Min	Typ.	Max	Unit
Forward Voltage	Vf	If=270mA	19.6	21	22.4	V
Luminance for LCM	Yu	If=270mA	450	500	-	cd/m^2

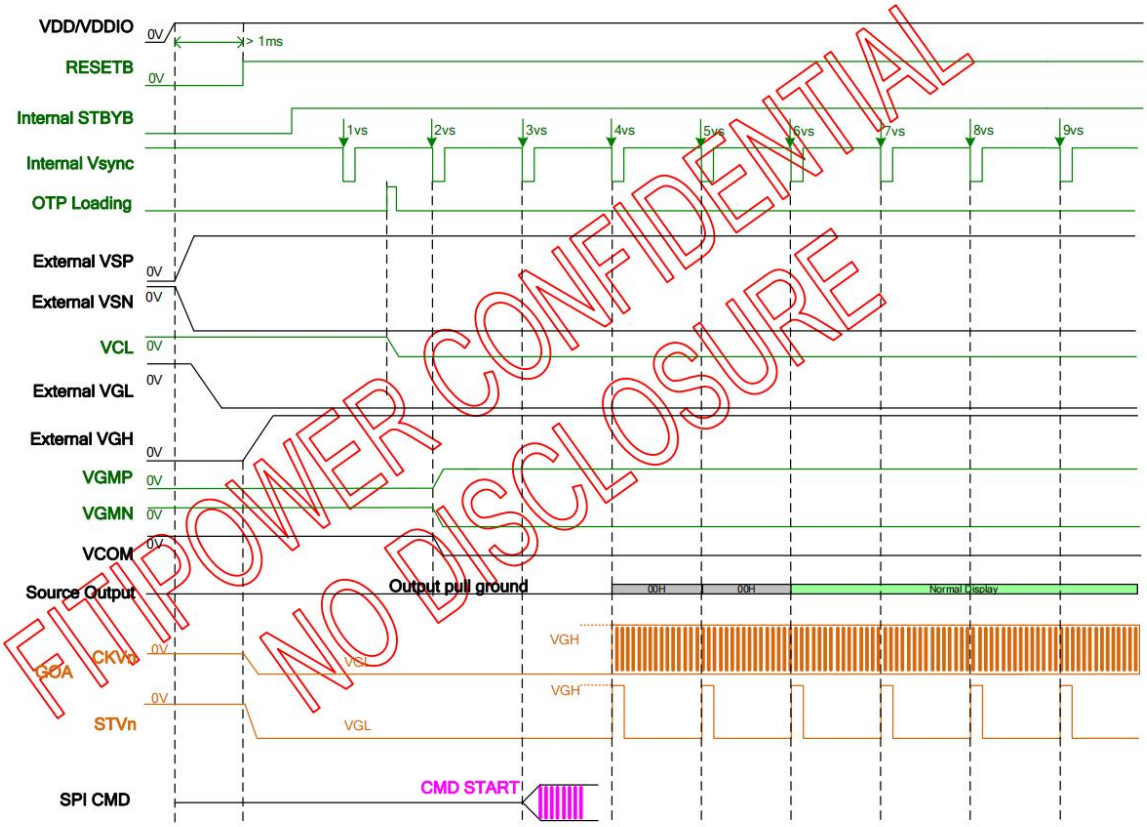


7*6=42LED 21V, 270mA

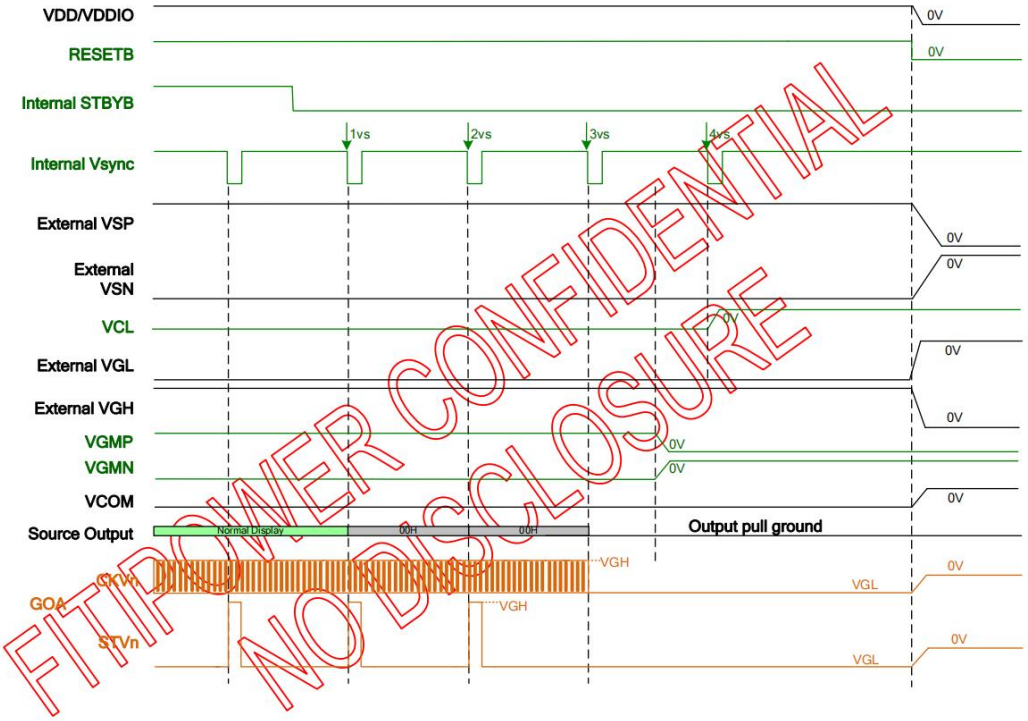
5.4 Power On/Off Sequence

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

Power ON



POWER OFF

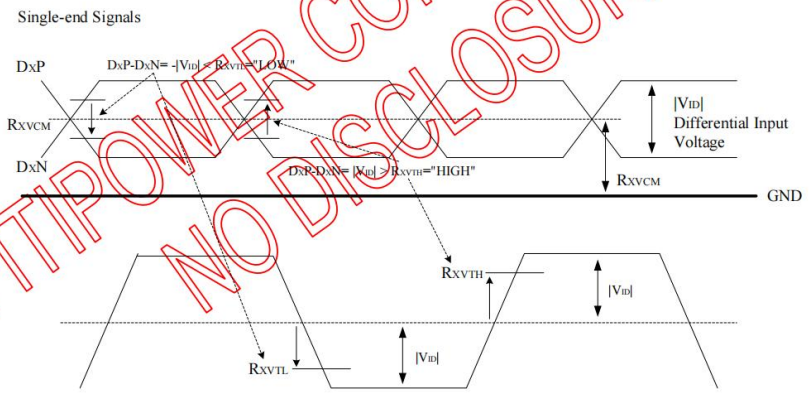


6. Signal Timing Characteristics

6.1 DC electrical Characteristics

(VDD=VDDIO=VDDIF=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R_{XVTH}	+0.1	0.2	0.3	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.7	-	1.7	V	
Differential input common mode voltage	R_{XVCM}	1	1.2	1.4	V	$\|V_{ID}\|$=0.2
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	I_{LCLVDS}	-10	-	+10	uA	
LVDS Digital Operating Current	I_{VDD}	-	15	20	mA	F_{DCLK}=80MHz,VDD=3.3V, Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	I_{ST}	-	-	250	uA	Clock & all Functions are stopped



6.2 AC electrical Characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

Table 13.1: LVDS mode AC electrical characteristics

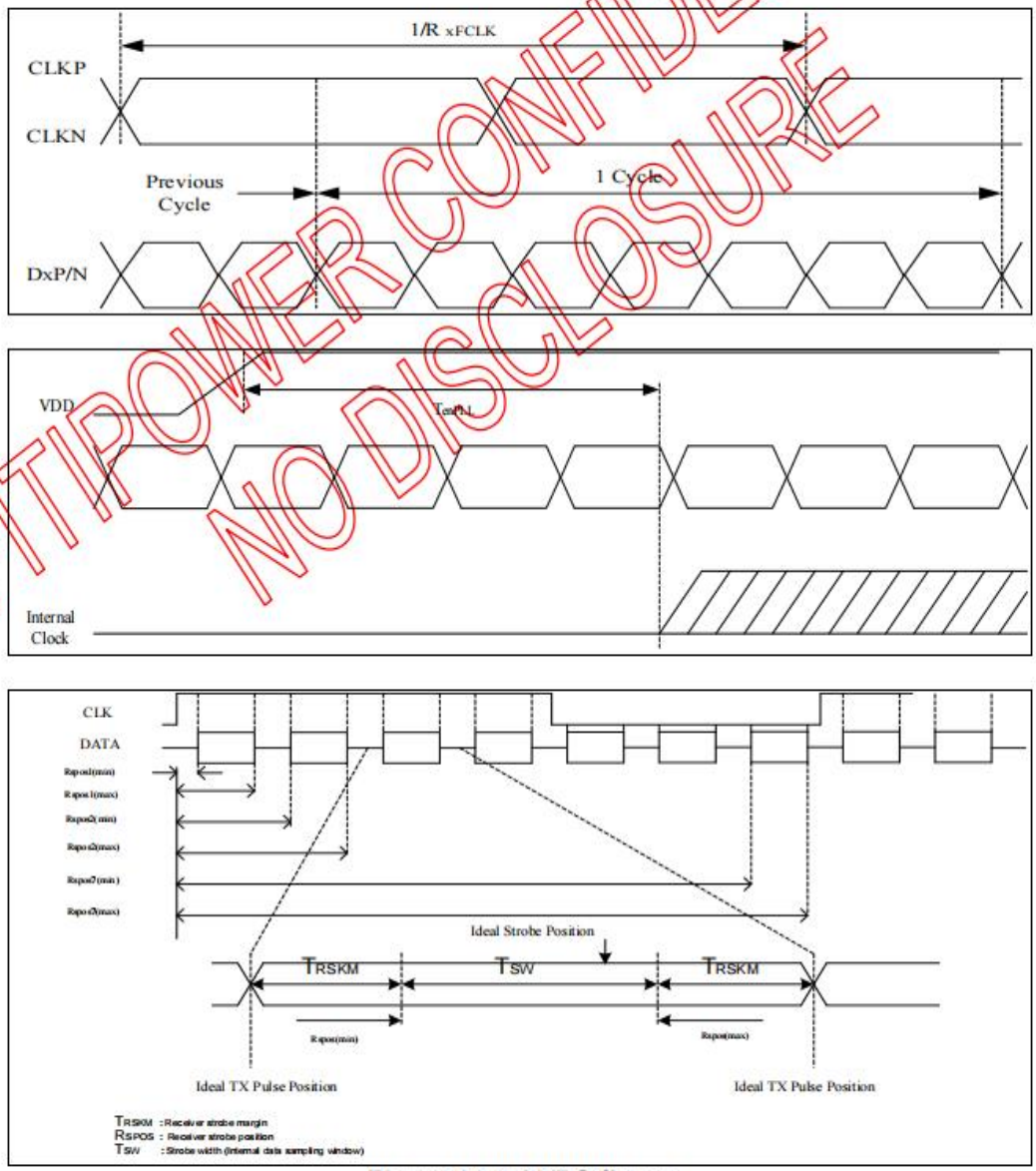
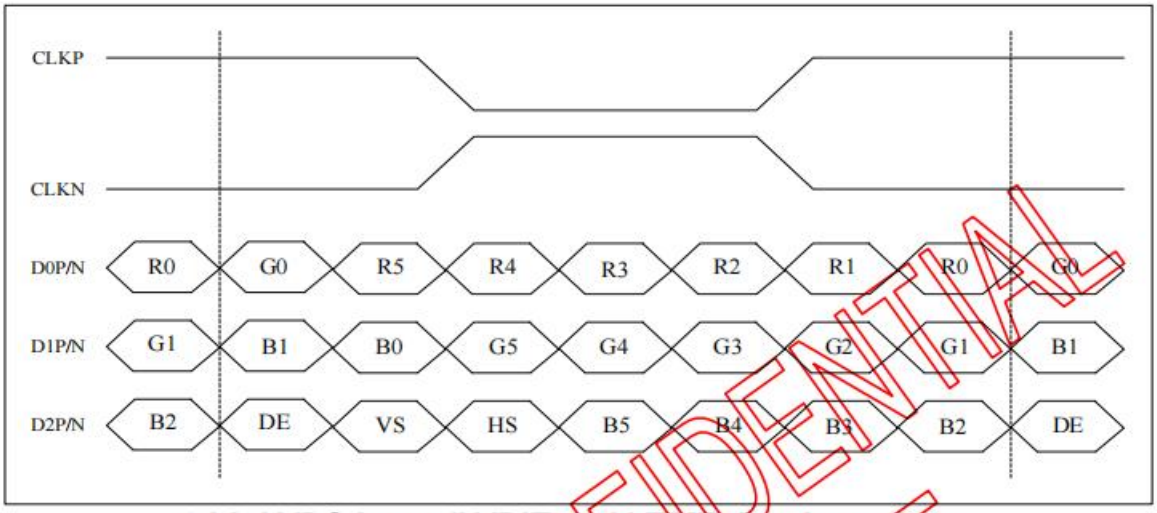
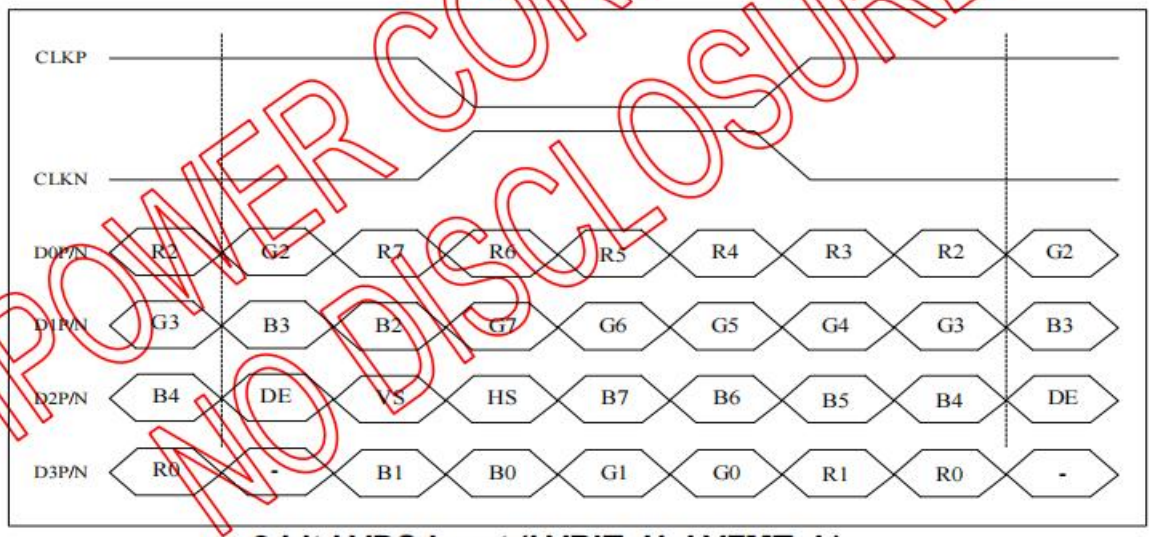


Figure 13.3: LVDS figure

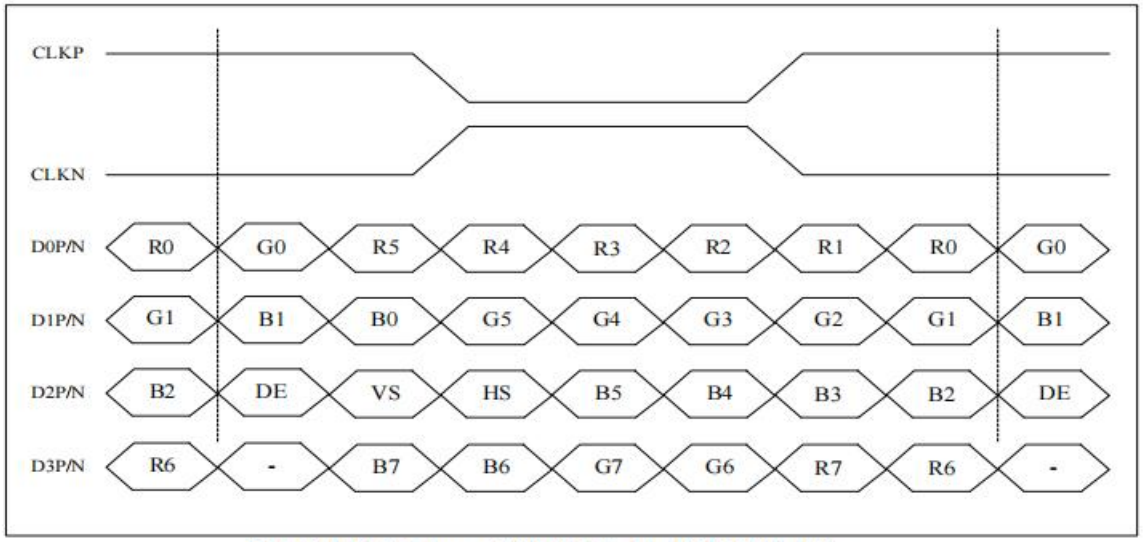
Data input format for LVDS



6-bit LVDS input (LVBIT=L, LVFMT=Don't care)



8-bit LVDS input (LVBIT=H, LVFMT=L)



8-bit LVDS input(LVBIT=H, LVFMT=H)

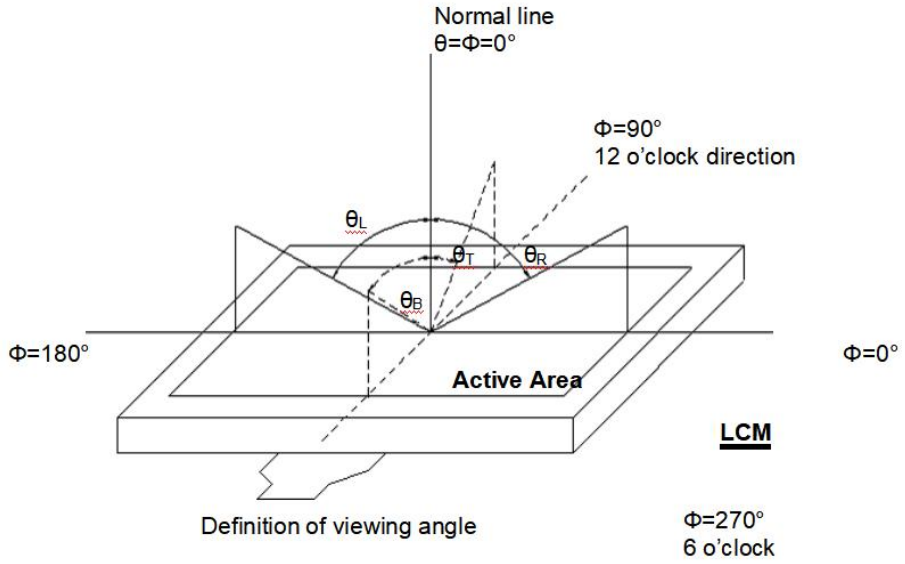
6.3 Timing Setting Table

Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)		F_{DCLK}	66.3	72.4	78.9	MHz
HSYNC period time		T_H	1380	1440	1500	DCLK
Horizontal display area		T_{HD}	1280			DCLK
HSYNC pulse width	Min.	T_{HPW}	2			
	Typ.		-			
	Max.		40			
HSYNC back porch(with pulse width)		T_{HBP}	88	88	88	DCLK
HSYNC front porch		T_{HFP}	12	72	132	DCLK
VSYNC period time		T_V	824	838	872	H
Vertical display area		T_{VD}	720			H
VSYNC pulse width	Min.	T_{VPW}	2			H
	Typ.		-			
	Max.		20			
VSYNC back porch(with pulse width)		T_{VBP}	23	23	23	H
VSYNC front porch		T_{VFP}	1	15	49	H

7. Optical specifications

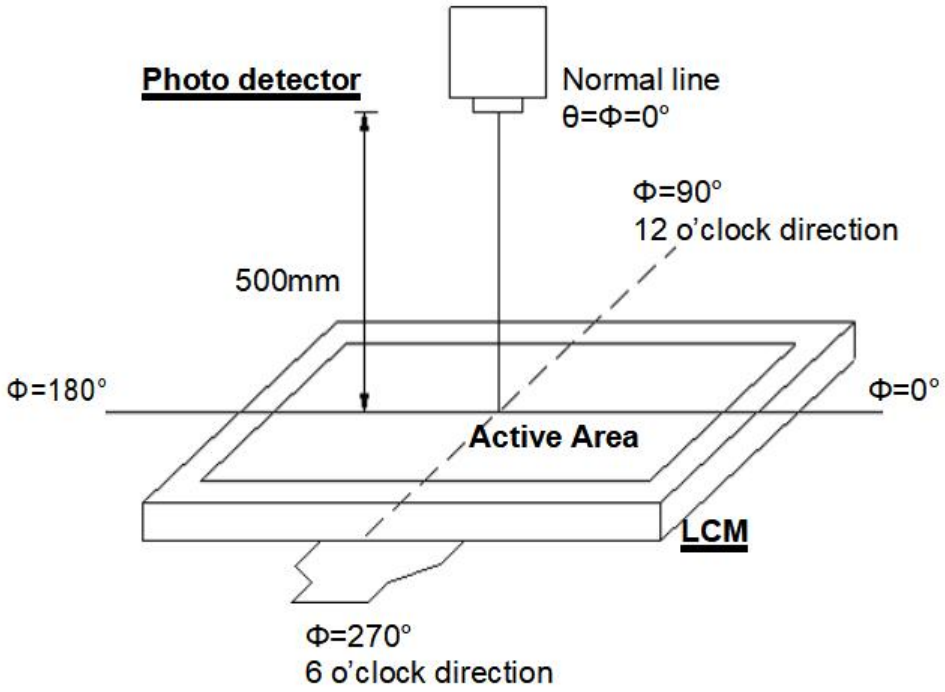
Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180° (9 o'clock)	-	85	-	degree	Note 1
	θ_R	Φ=0° (3 o'clock)	-	85	-		
	θ_T	Φ=90° (12 o'clock)	-	85	-		
	θ_B	Φ=270° (6 o'clock)	-	85	-		
Response time Rise+Fall	T_{RT}	Normal θ=Φ=0°	-	20	-	msec	Note 3
Contrast ratio	CR		800	1000	-	-	Note 4
Color chromaticity	W_X		-	0.306	-	-	Note 2
	W_Y		-	0.328	-	-	Note 5
NTSC	Ratio		-	70	-	%	Note 6
Luminance	L		450	500	-	cd/㎡	Note 6

Note 1: Definition of viewing angle range



Note 2: Definition of optical measurement system.

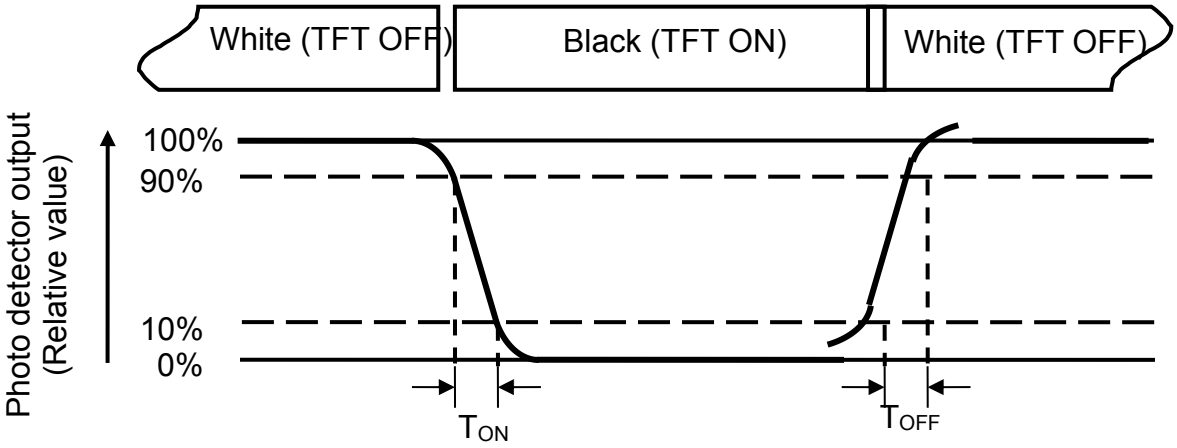
The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-7A, other items are measured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



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%.



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.

8. Reliability Test Conditions And Methods

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 240hrs	
Low Temperature Storage	Ta = -30℃ 240 hrs	
High Temperature Operation	Ts = 80℃ 240 hrs	
Low Temperature Operation	Ta = -30℃ 240 hrs	
Operate at High Temperature and Humidity	60℃, 90%RH max. 240 hrs	Operation
Thermal Shock	-30℃~+80℃ 100cycles 0.5 Hrs/cycle	Non-operation
Electrostatic Discharge	Contact=±4KV, class B Air=±8KV, class B	

Note1: 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.
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

9. Package Drawing

TBD