

SPECIFICATION

PRODUCT NO. : TCXD070IBLMA-101

VERSION : Ver 1.2

ISSUED DATE : 2021-11-18

This module uses ROHS material

FOR CUSTOMER: _____

☐: APPROVAL FOR SPECIFICATION

☐: APPROVAL FOR SAMPLE

DATE	APPROVED BY

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Note:

1.Xinli Optronics reserves the right to make changes without further notice to any products herein to improve reliability, function or design.

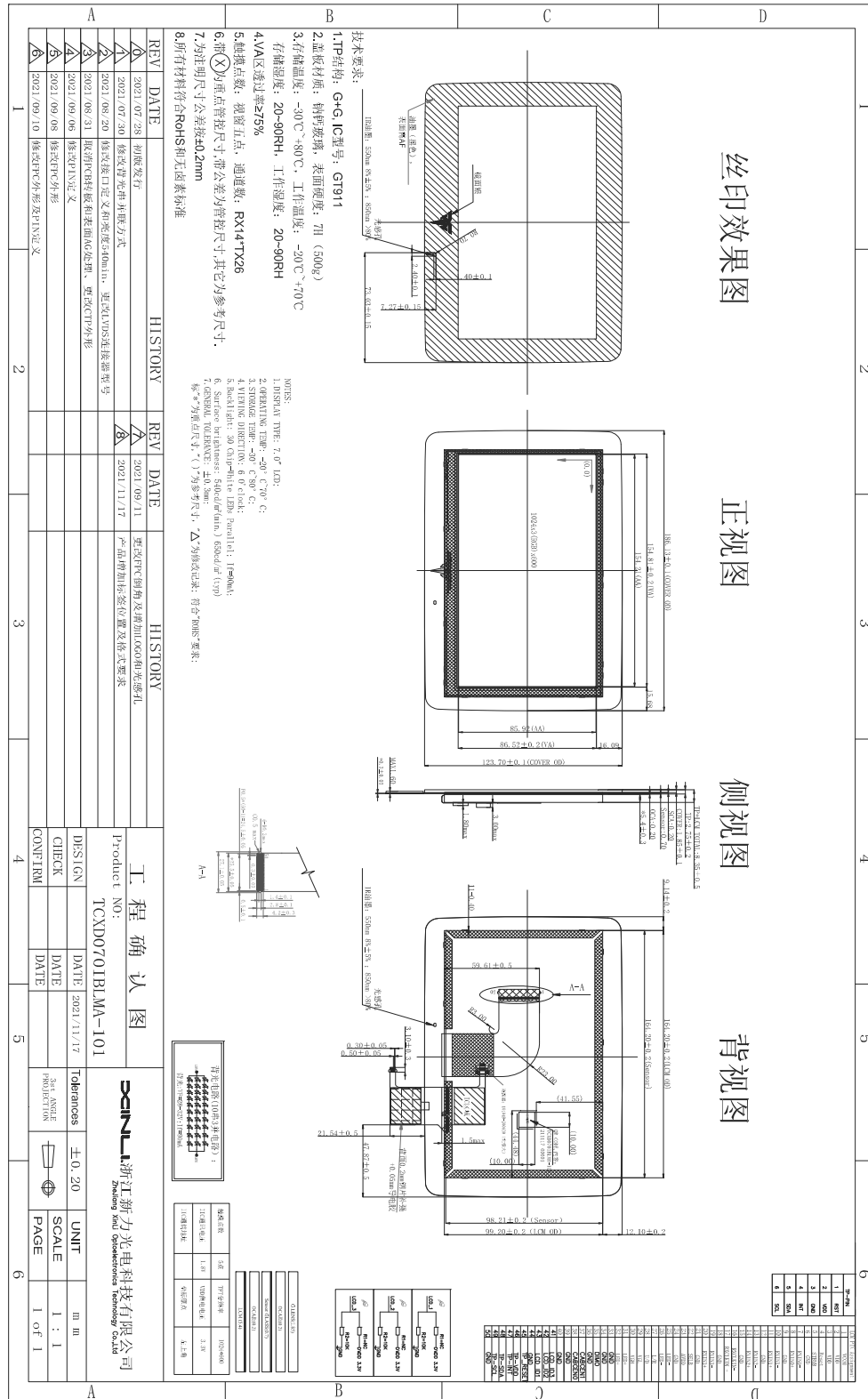
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2. General Description and Features

The 7.0 inch Module named TCXD070IBLMA-101 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, FPC , Back-Light and CTP unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outline	181.6 x 114.1 x 8.35	mm
(2)	LCD Active area	154.21 x 85.92	mm
(3)	Dot Number	1024 x 3(RGB) x 600	/
(4)	Dot size	0.0502(H) x 0.1432(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	6(Gray inversion)	O'clock
(8)	Backlight Type	30-chip	/
(9)	Power Supply	3.3(TYP)	V
(10)	Interface	FPC 0.5mm_Pitch 50pin	/
(11)	Interface type	LVDS interface	/
(12)	Module weight	TBD	g

3. Mechanical Dimension



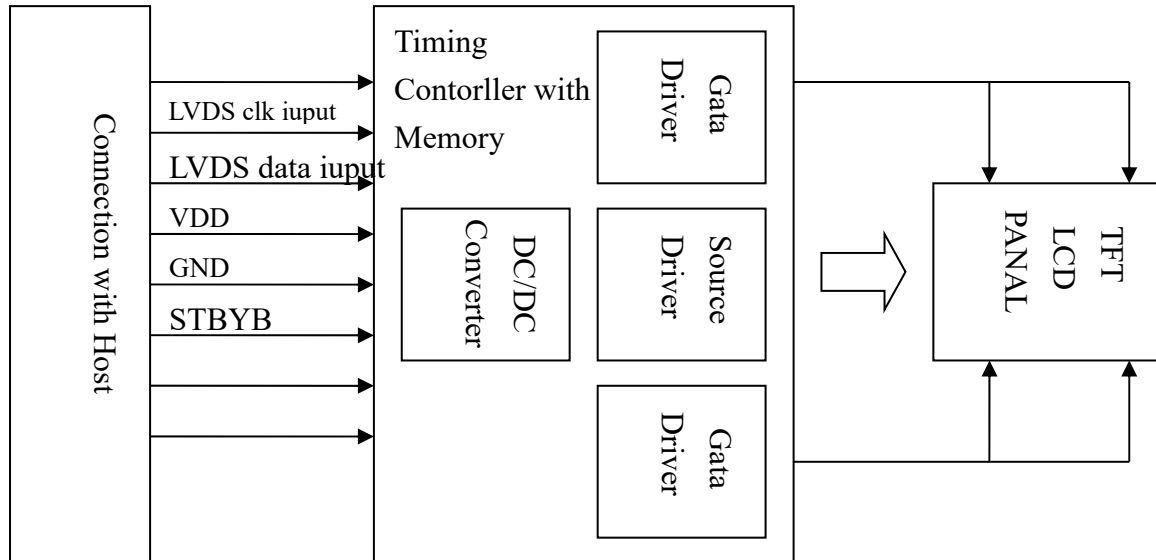
4. Interface Pin Connection

FPC Connector is used for the module electronics interface.

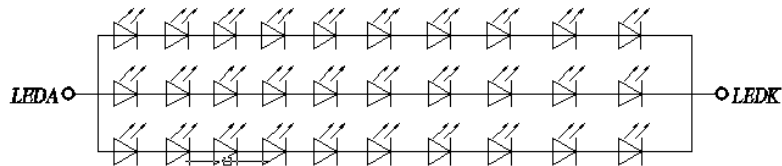
NO	Symbol	Level	Description
1	VCOM	P	Common Voltage
2	VDD	P	Power Voltage for digital circuit
3	VDD	P	Power Voltage for digital circuit
4	RESET	I	Global reset pin: Active low to enter reset mode. Suggest connecting with an RC reset circuit for stability. Normally pull high. (R=10K _Ω , C=0.1μF)
5	STBYB	I	Standby mode, Normally pulled high STBYB = “1”, normal operation STBYB = “0”, timing controller, source driver will turn off, all output are High-Z
6	GND	P	Ground
7	RXIN0-	I	- LVDS differential data input
8	RXIN0+	I	+LVDS differential data input
9	GND	P	Ground
10	RXIN1-	I	- LVDS differential data input
11	RXIN1+	I	+LVDS differential data input
12	GND	P	Ground
13	RXIN2-	I	- LVDS differential data input
14	RXIN2+	I	+LVDS differential data input
15	GND	P	Ground
16	RXCLKIN-	I	- LVDS differential clock input
17	RXCLKIN+	I	+LVDS differential clock input
18	GND	P	Ground
19	RXIN3-	I	- LVDS differential data input
20	RXIN3+	I	+LVDS differential data input
21	GND	P	Ground
22	SELB	I	6bit/8bit mode select If LVDS input data is 6 bits ,SELB must be set to High; If LVDS input data is 8 bits ,SELB must be set to Low.
23	AVDD	P	Power supply for analog circuits

24	GND	P	Ground
25	LED-	P	LED cathode
26	LED-	P	LED cathode
27	L/R	I	When L/R="0",set right to left scan direction. When L/R="1", set left to right scan direction.
28	U/D	I	When U/D="0", set top to bottom scan direction. When U/D="1", set bottom to top scan direction.
29	VGL	P	Power supply for drive output Low
30	VGH	P	Power supply for drive output High
31	LED+	P	LED Anode
32	LED+	P	LED Anode
33	GND	P	Ground
34	GND	P	Ground
35	DIMO	O	Backlight dimmer signal for external controller DIMO = H , Logical control signal to turn on external backlightcontroller DIMO = L . Turn off external backlight
36	GND	P	Ground
37	CABCEN1	I	CABC H / W enable pin . Normally pull low When CABC EN = " 00 , CABC off . (Default mode When CABC EN = " 01 , user interface Image When CABC EN = 10 still Picture When CABC EN = 11 , moving Image
38	CABCEN0		
39	GND	P	Ground
40	GND	P	Ground
41	ID1	O	ID pin Internal pull down
42	ID2	O	ID pin Internal pull down
43	ID3	O	ID pin Internal pull down
44	GND	P	Ground
45	TP-RST	I	CTP Reset pin(1.8V)
46	TP-VDD	P	CTP Power supply(2.8V)
47	TP-INT	O	I2C: Interrupt pin(1.8V)
48	TP-SDA	I/O	I2C: Data input and output(1.8V)
49	TP-SCL	I	I2C:Clock input(1.8V)
50	GND	P	Ground

5. Block Diagram



背光电路(10串3并电路)：



背光:VF=28-32V; If=90mA

6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	°C
Storage temperature	Tst	-30 to 80	°C
Power Voltage	VDD	-0.3~5	V
CTP Power Voltage	CTP_VDD	-0.3~3.6	V

NOTE:

If the module was used these absolute maximum ratings as above, it may be damaged permanently. Using the module within the following electrical characteristic

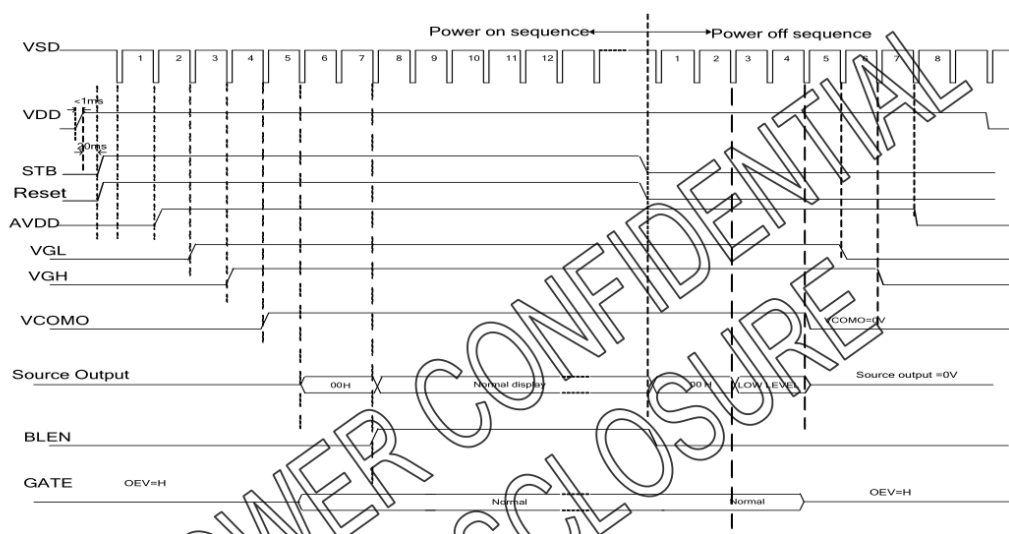
conditions are also exceeded, the module will malfunction and cause poor reliability.
VDD>GND must be maintained.

7. Electrical Characteristics

Item	Symbol	Min.	Typ	Max.	Unit	Note
Supply Voltage	V DD	3.0	3.3	3.6	V	
CTP Supply Voltage	CTP_VDD	2.6	2.8	3.0	V	
Input signal voltage	V IH	0.7 VDD	-	VDD	V	
Input signal voltage	V IL	0	-	0.3VDD	V	

8.Timing Characteristics

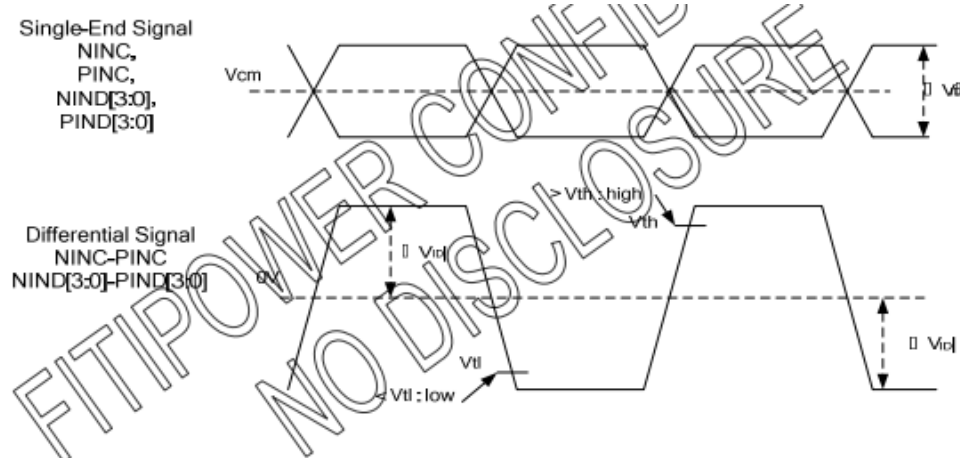
8.1. Power-On/Off Timing Sequence



8.2.LVDS DC characteristic

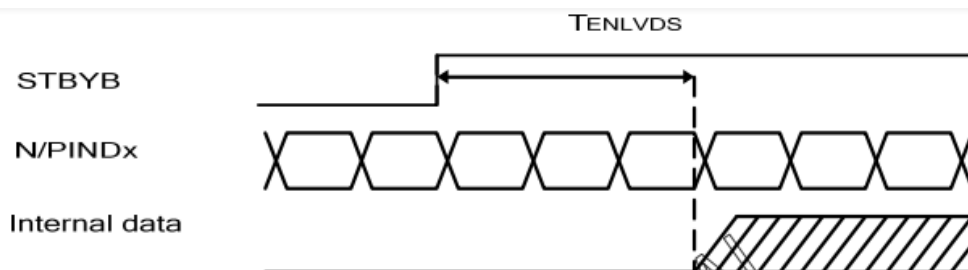
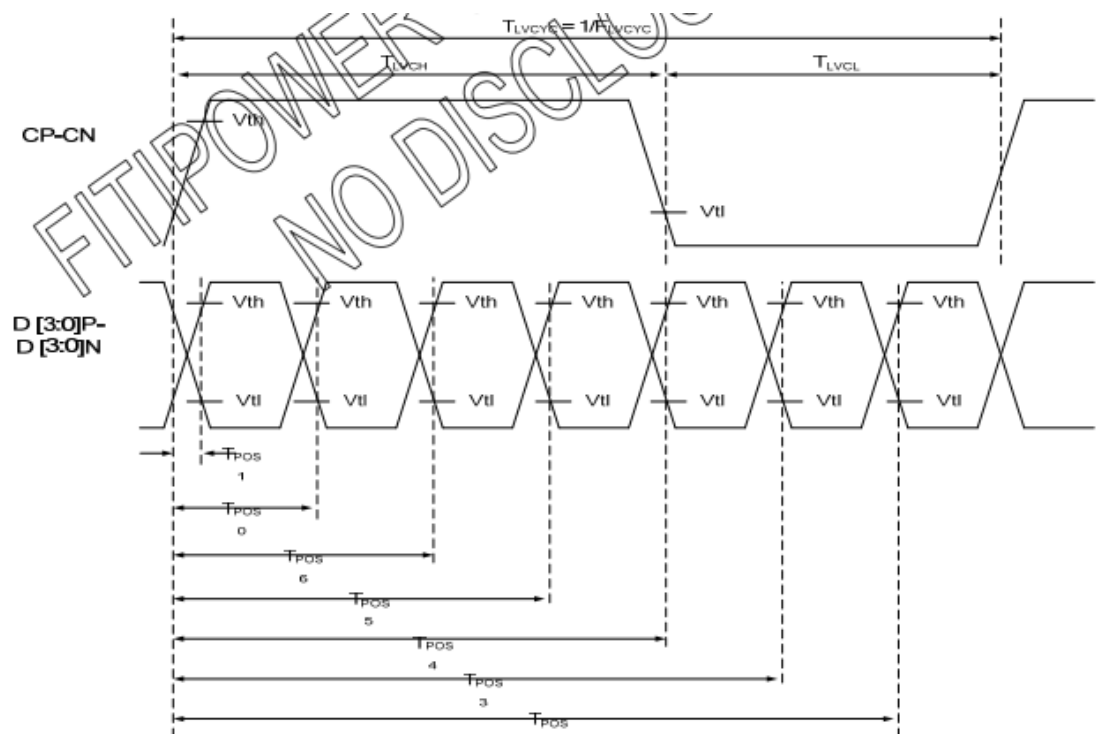
LVDS DC characteristic

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max	
Differential input high Threshold voltage	V _{th}	V _{cm} =1.2V	-	-	+0.1	V
Differential input low Threshold voltage	V _{tl}		-0.1	-	-	V
Differential input common Mode voltage	V _{cm}		1	1.2	1.8- V _{ID} /2	V
LVDS input voltage	V _{INLV}		0.7	-	1.8	V
Differential input voltage	V _{ID}		0.2	-	0.6	V
Differential input leakage Current	I _{lvleak}		-10	-	+10	uA
Termination Resistor	Z _{id}		80	100	120	Ω



LVDS DC Characteristic

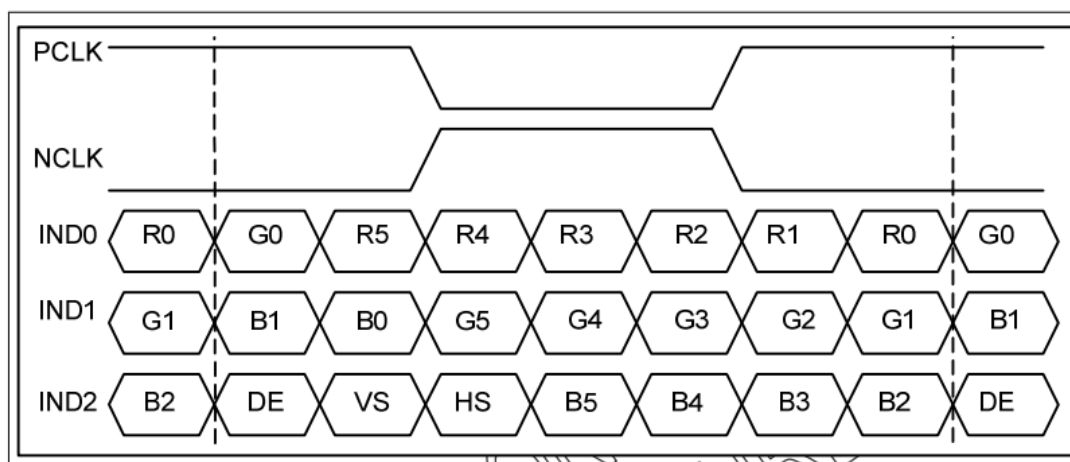
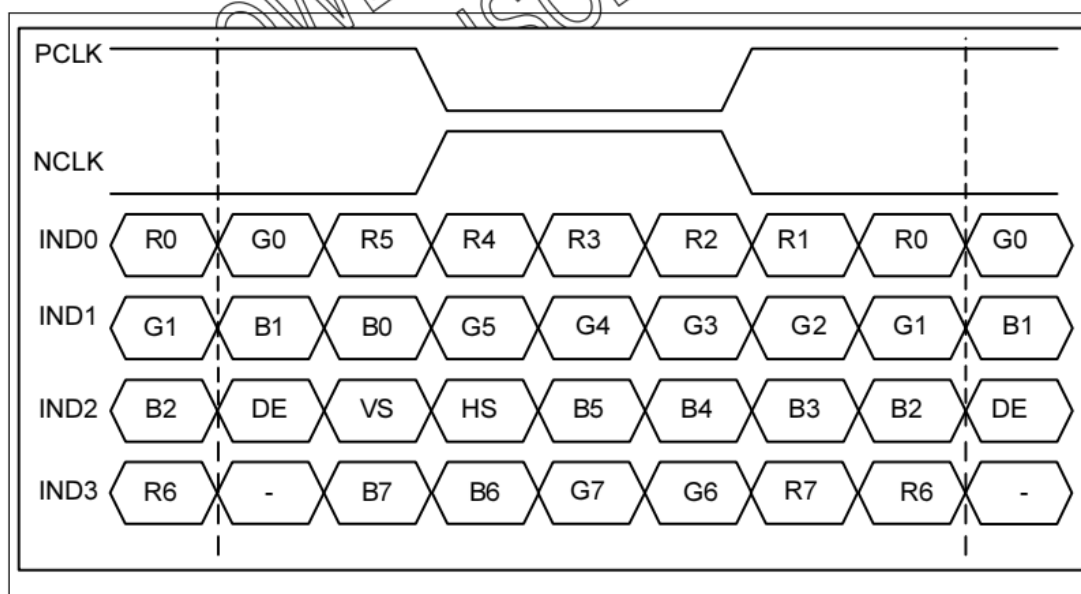
Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	F _{LVCYC}	40		67.2	MHz
Clock period	T _{LVCYC}			-	ps
1 data bit time	UI	-	1/7	-	T _{LVCYC}
Clock high time	T _{LVCH}	3.9	4	4.1	UI
Clock low time	T _{LVCL}	2.9	3	3.1	UI
Position 1	T _{POS1}	-0.2	0	0.2	UI
Position 0	T _{POS0}	0.8	1	1.2	UI
Position 6	T _{POS6}	1.8	2	2.2	UI
Position 5	T _{POS5}	2.8	3	3.2	UI
Position 4	T _{POS4}	3.8	4	4.2	UI
Position 3	T _{POS3}	4.8	5	5.2	UI
Position 2	T _{POS2}	5.8	6	6.2	UI
Input eye width	T _{EYEW}	0.6	-	-	UI
Input eye border	T _{EX}	-	-	0.2	UI
LVDS wake up time	T _{ENLVDS}	-	-	150	us



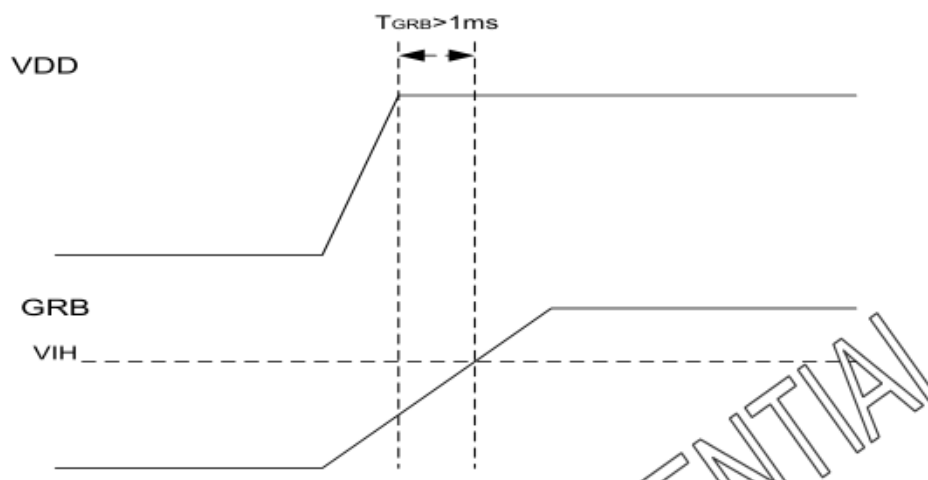
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK		20	-	71	MHz
Input data skew margin	TRSKM	$ V_{ID} =400\text{mV}$ $R_{XVCM}=1.2\text{V}$ $R_{XFCLK}=71\text{MHz}$	500			ps
Clock High Time	TLVCH			$4/(7 \times R_{XFCLK})$		ns
Clock Low Time	TLVCL			$3/(7 \times R_{XFCLK})$		ns
PLL wake-up time	TenPLL				150	us

Output Timing Table

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
DCLK frequency	Fclk	-	65	71	MHz	VDD =2.3~3.6V
DCLK cycle time	Tclk	14.1	15.4		ns	
DCLK pulse duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	64	-	DCLK	
Time from HSD to LD	Thld	-	64	-	DCLK	
Time from HSD to STV	Thstv	-	2	-	DCLK	
Time from HSD to CKV	Thckv	-	20	-	DCLK	
Time from HSD to OEV	Thoev	-	4	-	DCLK	
LD pulse width	Twld	-	10	-	DCLK	
CKV pulse width	Twckv	-	66	-	DCLK	
OEV pulse width	Twoev	-	74	-	DCLK	

6.6.1. 6-bit LVDS input(HSD="H")**6.6.2. 8-bit LVDS input(HSD="L")**

8.3 RESET Timing



9. Application Circuit

Please consult our technical department for detail information.

10. Initial Code

Please consult our technical department for detail information.

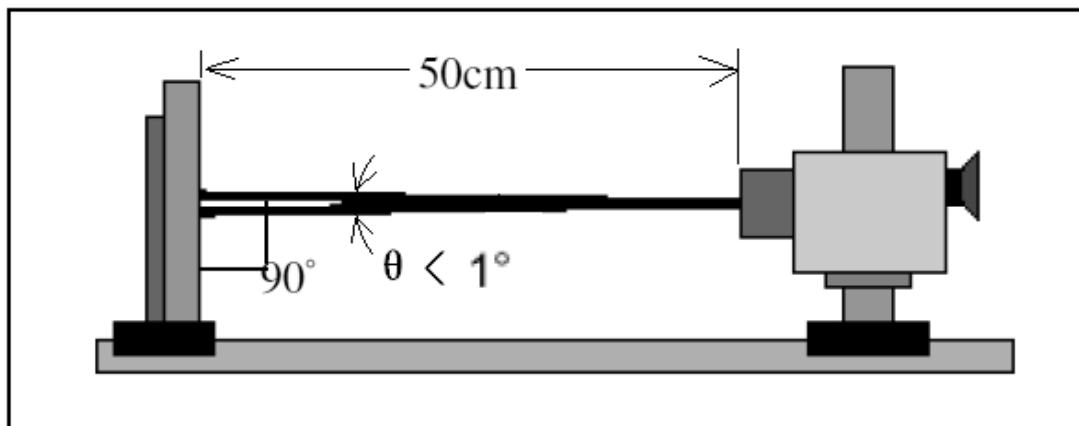
11. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr	$\theta = 0^\circ$	-	10	-	ms	4
		Tf	$\phi = 0^\circ$	-	15	-	ms	
Uniformity (Five point)		δ WHITE	Ta=25℃	-	80	-	%	7
Contrast ratio		Cr		600	800	-	-	3,5
Surface Luminance		Lv		540	650	-	-	3,7
Viewing angle range		θ	$\phi = 90^\circ$	-	(80)	-	deg	6
			$\phi = 270^\circ$	-	(80)	-	deg	
			$\phi = 0^\circ$	-	(60)	-	deg	
			$\phi = 180^\circ$	-	(70)	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		7
		Y		TBD	TBD	TBD		
	Red	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		

Note 1: Ambient temperature=25℃±2℃

Note 2: To be measured in the dark room with backlight unit.

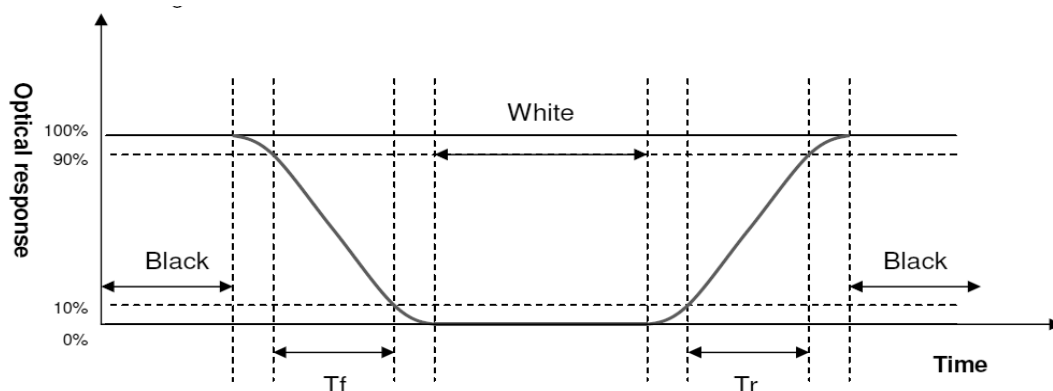
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.

Refer to figure as below.



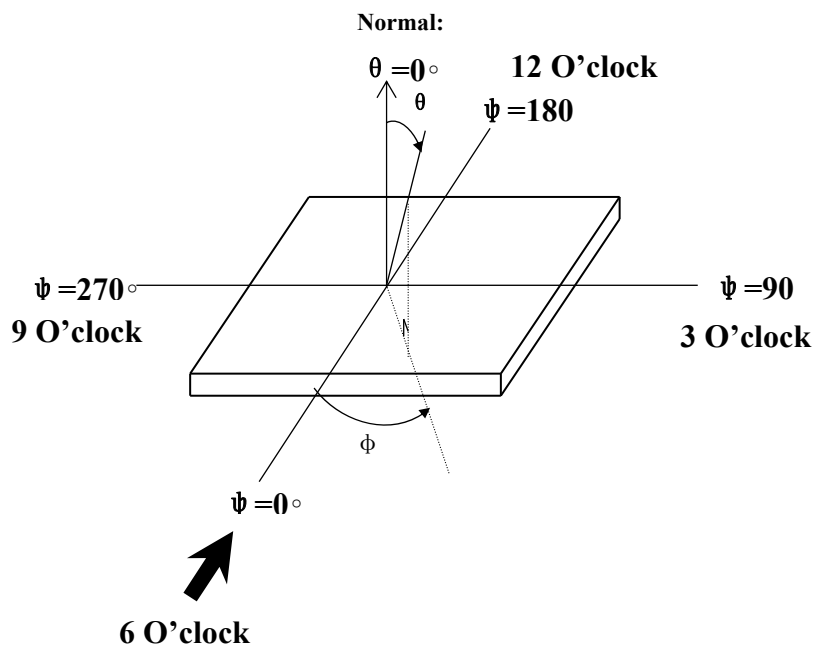
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

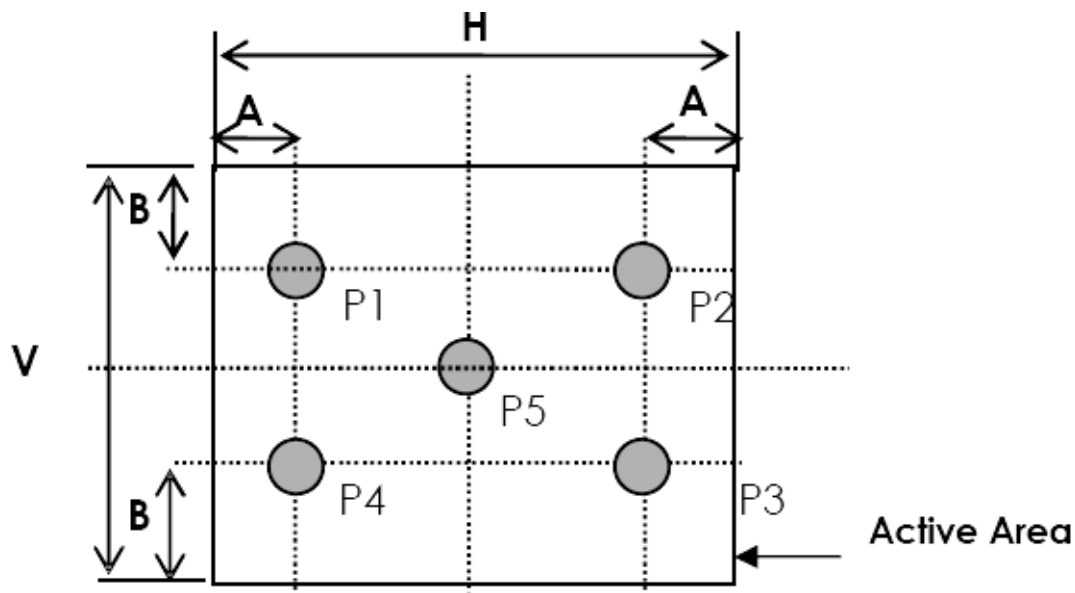
Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.



Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



A : 5 mm B : 5 mm H,V : Active Area

Light spot size $\varnothing=7\text{mm}$, 500mm distance from the LCD surface to detector lens

measurement instrument is TOPCON's luminance meter BM-7A

Uniformity definition= [min of 5point/max of 5points]x100%

L_v = Average Surface Luminance with all white pixels (P₁, P₂, P₃, P₄, P₅)

12. Reliability Test

This standard reliability test is done only for the first lot of MP products. Customer and supplier must hold a discussion if other reliability test is requested by customer.

NO.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80℃,240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 240H
6	Vibration test	(Frequency range:10Hz~50Hz Acceleration of gravity:5G X, Y, Z 30 min for each direction.)	30 min for each direction.

13. Precautions for Operation and Storage

1. Precautions for Operation

- (1) Since LCD panel made of glass, in order to prevent from glass broken or color tone change, please do not apply any mechanical shock or impact or excessive force to it when installing the LCD module.
- (2) If LCD panel is broken and liquid crystal substance leaks out and contact your skin or clothes, please immediately wash it off by using soap and water.
- (3) The polarizer on the LCD surface is soft and easily scratched. Please be careful when handling.
- (4) If LCD surface becomes contaminated, please wipe it off gently by using moist soft cloth with normal hexane, do not use acetone, ketone, ethanol, alcohol or water. If there is saliva or water on the LCD surface, please wipe it off immediately.

- (5)When handing LCD module,please be sure that the body and the tools are properly grounded.And do not touch I/F pins with bare hands or contaminate I/F pins.
- (6)Do not attempt to disassemble or process the LCD module.
- (7)LCD module should be used under recommended operating conditions shown in chapter 6 and 7.
- (8)Response time will be extremely slower at lower temperature than at specified temperature and LCD will show different color when at higher temperature.The phenomenon will disappear when returning to specified condition.
- (9)Foggy dew,moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage,the deteriorated display quality and electrochemical reaction then leads to the shorter life time and permanent damage to the module probably.Please pay attention to the environmental temperature and humidity.

2. Precautions for Storage

- (1)Please store LCD module in a dark place,avoid exposure to sunlight,the light of fluorescent lamp or any ultraviolet ray.
- (2)Keep the environment temperature at between 10℃and 35 ℃ and at normal humidity.Avoid high temperature,high humidity or temperature below 0℃.
- (3)That keeps the LCD modules stored in the container shipped from supplier before using them is recommended.
- (4)Do not leave any article on the LCD module surface for an extended period of time.

3. Warranty period

Warrants for a period of 12 Months from the shipping date when stored or used under normal condition.

14. Package Specification

TBD