SPECIFICATION

PRODUCT NO. : **TCXD043IWLON-21B**
VERSION : **Ver 1.0**
ISSUED DATE : **2022-1-8**

This module uses ROHS material

FOR CUSTOMER: _____

□: APPROVAL FOR SPECIFICATION
■: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optronics :

Presented by	Reviewed by	Organized by

Note:

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

2.All rights are reserved. No one is permitted to reproduce or duplicate the whole or part of this document without Xinli Optronics permission.

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

1. Revision Recode

Revision	Description	Date
1.0	Initial Release	2022/1/8

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

2. General Description and Features

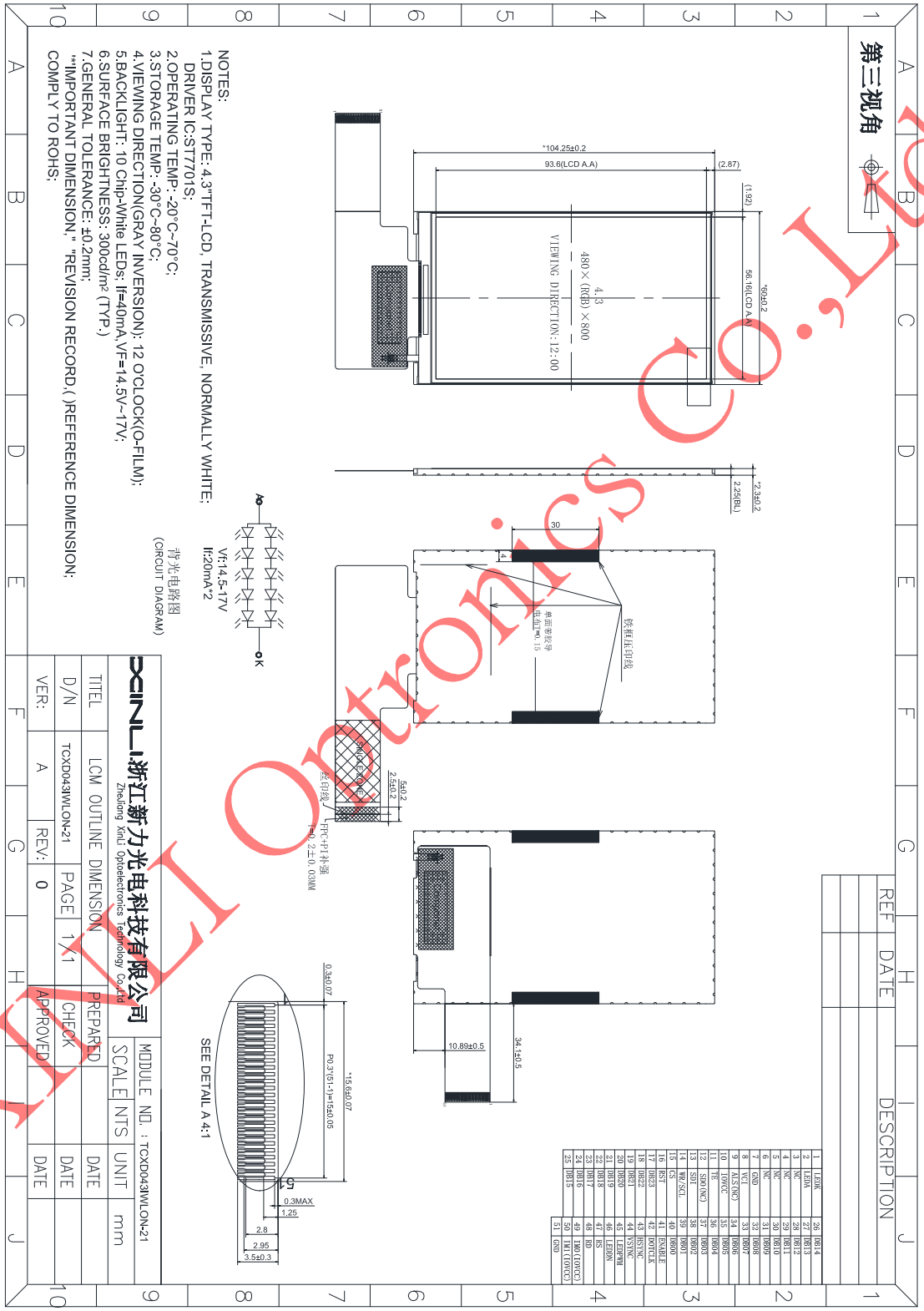
The 4.3 inch Module named TCXD043IWLON-21B is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, FPC and Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outline	60x 104.25x 2.3	mm
(2)	LCD Active area	56.16 x 93.6	mm
(3)	Dot Number	480 x 3(RGB) x 800	/
(4)	Dot size	0.117(H) x 0.117(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	12	O’ clock
(8)	Backlight Type	10-chip	/
(9)	Power Supply	2.8(TYP)	V
(10)	Interface	FPC 0.3mm_Pitch 51pin	/
(12)	Module weight	TBD	g

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

3. Mechanical Dimension



XINLI Ontronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

4. Interface Pin Connection

FPC Connector is used for the module electronics interface. The recommended model is FH26-51S-0.3SHW manufactured by Hirose or compatible。

NO	Symbol	Level	Description
1	LEDK	P	LED power (Cathode)
2	LEDA	P	LED power (Anode)
3	NC	-	Not connect
4	NC	-	Not connect
5	NC	-	Not connect
6	NC	-	Not connect
7	GND	P	Ground
8	VCI	P	Operating voltage(2.8V)
9	ALS	-	Not connect
10	IOVCC	P	I/O Supply voltage(1.8V)
11	TE	-	Tearing effect output
12	SDO	-	Serial data output pin used for the SPI Interface.
13	SDI	I/O	Serial data input/output bidirectional pin for SPI Interface
14	WR/SCL	I	Serial clock input for SPI interface
15	CS	I	Chip select signal
16	RST	I	Reset input
17	DB23	I	Data input
18	DB22	I	Data input
19	DB21	I	Data input
20	DB20	I	Data input
21	DB19	I	Data input
22	DB18	I	Data input
23	DB17	I	Data input
24	DB16	I	Data input
25	DB15	I	Data input
26	DB14	I	Data input
27	DB13	I	Data input
28	DB12	I	Data input

XINLI Optronics Co.,Ltd

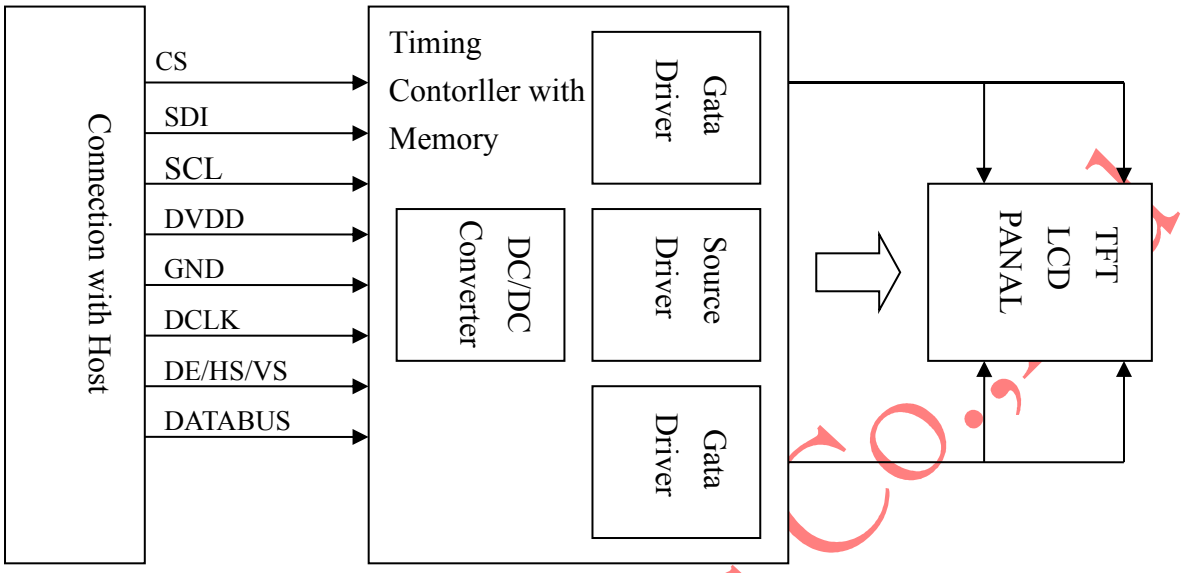
The copyright belongs to XINLI. Any unauthorized use is prohibited.

29	DB11	I	Data input
30	DB10	I	Data input
31	DB09	I	Data input
32	DB08	I	Data input
33	DB07	I	Data input
34	DB06	I	Data input
35	DB05	I	Data input
36	DB04	I	Data input
37	DB03	I	Data input
38	DB02	I	Data input
39	DB01	I	Data input
40	DB00	I	Data input
41	ENABLE	I	Data enable signal for RGB interface operation
42	DOTCLK	I	Dot clock signal for RGB interface operation
43	HSYNC	I	Line synchronizing signal for RGB interface operation
44	VSYNC	I	Frame synchronizing signal for RGB interface operation
45	LEDPWM	O	The PWM frequency output for LCD driver control
46	LEDDN	O	Used for turning On/Off external LED backlight control
47	RS	-	Not connect
48	RD	-	Not connect
49	IM0	-	Connect to IOVCC
50	IM1	-	Connect to GND
51	GND	P	Ground

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

5. Block Diagram



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	℃
Storage temperature	Tst	-30 to 80	℃
Power Voltage	VCI	-0.3~4.6	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.

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

7. Electrical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Power Voltage		VCI	2.5	2.8	3.6	V
Logic Voltage		IOVCC	1.65	1.8	3.3	V
Logic input signal Voltage	H level	V_{IH}	0.7*IOVCC	-	IOVCC	V
	L level	V_{IL}	VSS	-	0.3*IOVCC	V

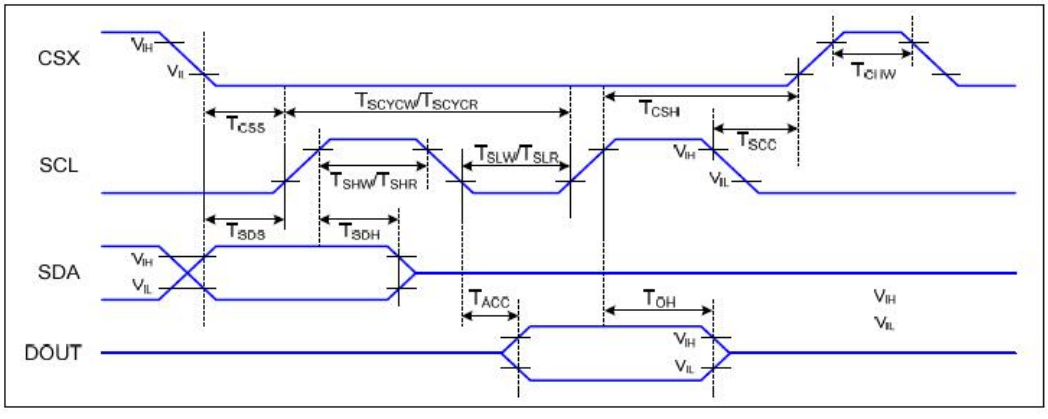
8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Power Voltage	-	14.5	15	17	V	IF=40mA
Number of LED	-		10		pcs	-
LED Life Time	LT	-	20000	-	Hours	

9. Timing Characteristics

9.1 AC Characteristics

Serial Interface Characteristics (3-line serial)



XINLI Optronics Co.,Ltd

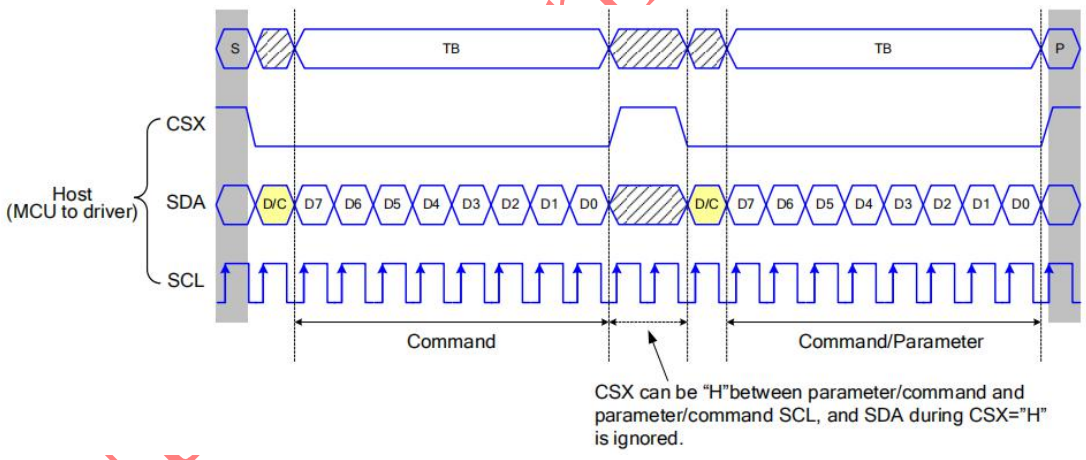
The copyright belongs to XINLI. Any unauthorized use is prohibited.

VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25℃

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	60		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	66		ns	
	T_{SHW}	SCL "H" pulse width (Write)	15		ns	
	T_{SLW}	SCL "L" pulse width (Write)	15		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	10		ns	
	T_{SDH}	Data hold time	10		ns	

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

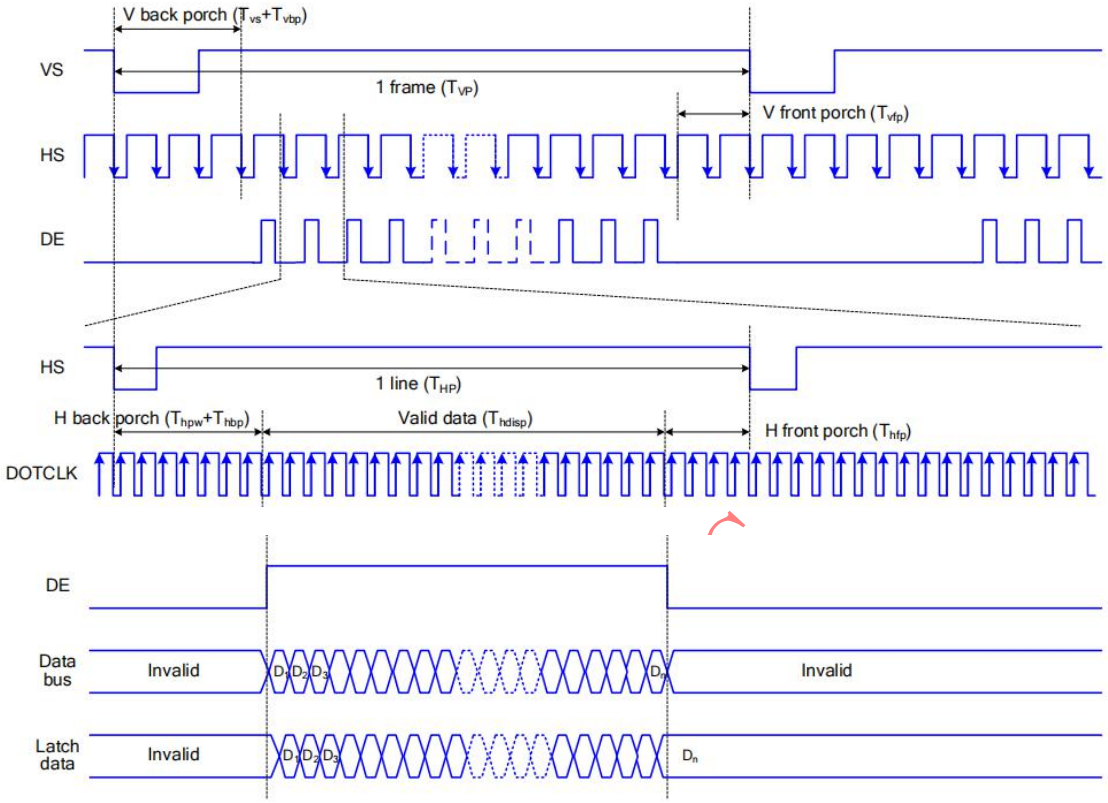
3.-line serial interface write protocol (write to register with control bit in transmission)



The copyright belongs to XINLI. Any unauthorized use is prohibited.

9.2 RGB Interface Characteristics

The timing chart of RGB interface DE mode is shown as follows.



Note: The setting of front porch and back porch in host must match that in IC as this mode.

Figure 23 Timing Chart of Signals in RGB Interface DE Mode

Please refer to the following table for the setting limitation of RGB interface signals.

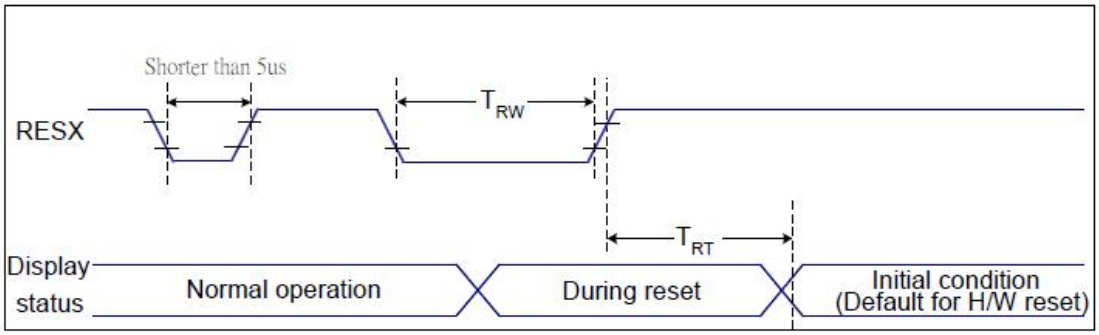
Parameter	Symbol	Min.	Typ.	Max.	Unit
Horizontal Sync. Width	hpw	2	-	255	Clock
Horizontal Sync. Back Porch	hbp	2	--	255	Clock
Horizontal Sync. Front Porch	hfp	2	--	-	Clock
Vertical Sync. Width	vs	2	--	254	Line
Vertical Sync. Back Porch	vbp	2	--	254	Line
Vertical Sync. Front Porch	vfp	2	--	--	Line

Note:

1. *Typical value are related to the setting frame rate is 60Hz..*

The copyright belongs to XINLI. Any unauthorized use is prohibited.

9.3 **Reset Timing**



VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25 ℃

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120(Note 1, 6, 7)	ms

Notes:

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to

registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

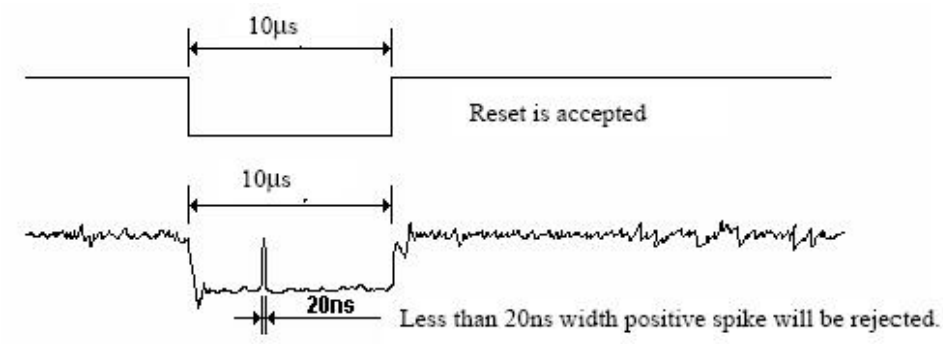
3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120

ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode.) and then return to Default condition

for Hardware Reset.

4. Spike Rejection also applies during a valid reset pulse as shown below:

The copyright belongs to XINLI. Any unauthorized use is prohibited.



5. When Reset applied during Sleep In Mode.

6. When Reset applied during Sleep Out Mode.

7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for

120msec.

10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

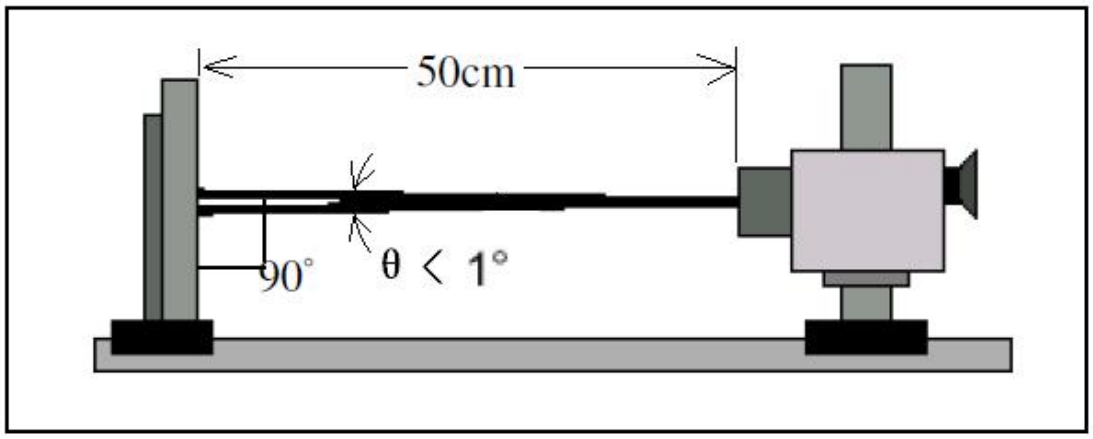
12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr+ Tf	θ =0°	-	16	32	ms	4
Uniformity (Five point)		δ WHITE	∅=0° Ta=25℃	80		-	%	7
Contrast ratio		Cr		-	600	-	-	3 ,5
Surface Luminance		Lv		-	300	-	-	3 ,7
Viewing angle range		θ	∅ = 90°		70	-	deg	6
			∅ = 270°		70	-	deg	
			∅ = 0°		70	-	deg	
			∅ = 180°		60	-	deg	
Color filter chromaticity (x, y)	White	X	θ = ϕ = 0°	0.27	0.31	0.35		7
		Y		0.29	0.33	0.37		

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:

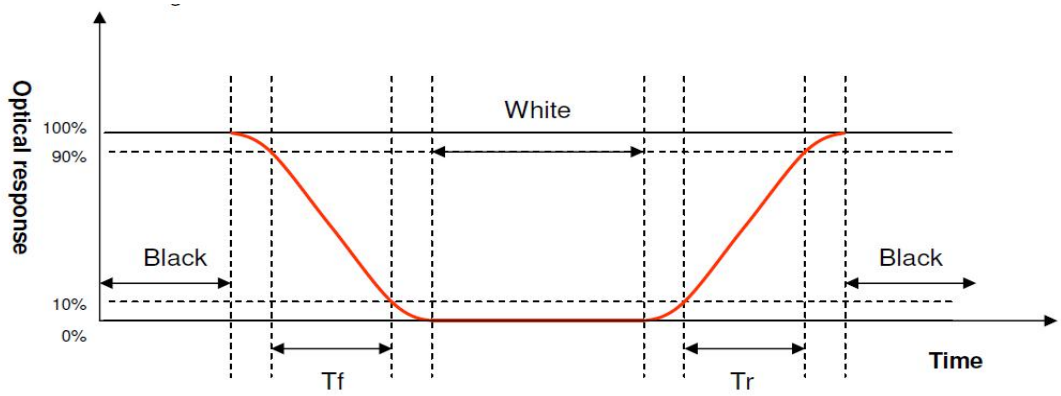
The output signals of photo detector are measured when the input signals are changed from "black" to "white" (rising time) and from "white" to "black" (falling

The copyright belongs to XINLI. Any unauthorized use is prohibited.

XINLI Optronics Co.,Ltd

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:

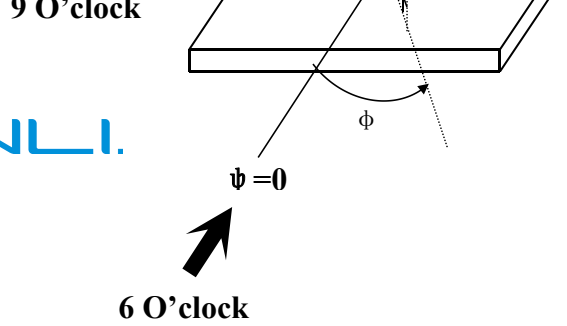
$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

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.

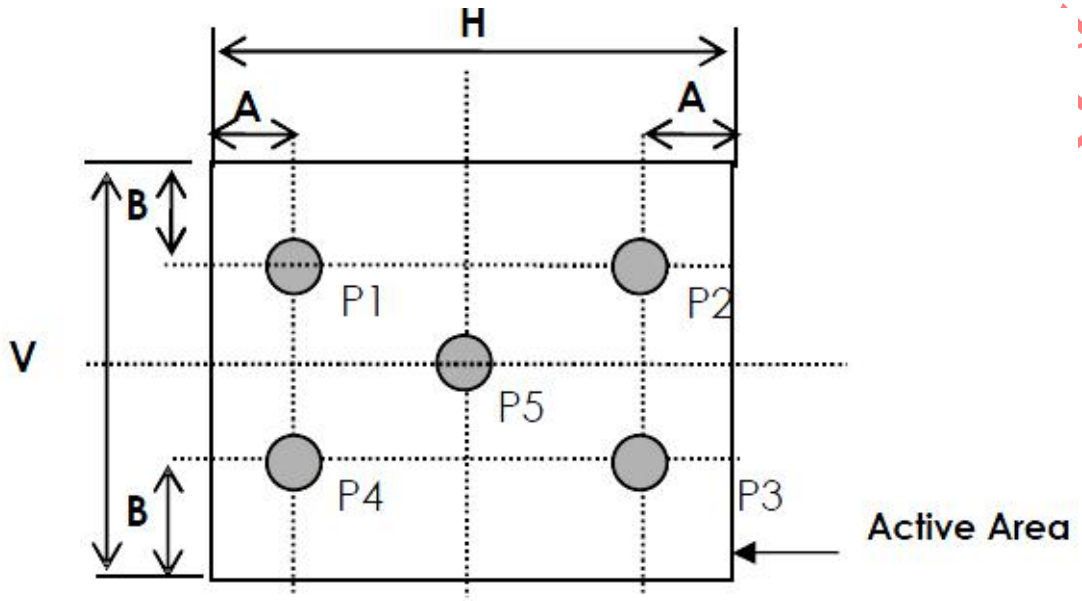
XINLI Optronics Co., Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.



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 Æ=7mm, 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%

Lv = Average Surface Luminance with all white pixels (P_1, P_2, P_3, P_4, P_5)

13. Reliability Test

This standard reliability test is done only for the first lot of MP products. Custom er 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℃,96 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,96H

XINLI Optron

The copyright belongs to XINLI. Any unauthorized use is prohibited.

3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,96H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,96H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 96H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle -20℃← →20℃ ← →70℃ 30min←→5min←→30min ◄——————————► one cycle	-20℃/70℃, 10cycles

14. 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 mois ten 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 immediate ly.

(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.

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

(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 enviro nmental 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 be fore 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.

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.

15. Package Specification

TBD

XINLI Optronics Co.,Ltd

The copyright belongs to XINLI. Any unauthorized use is prohibited.