

SPECIFICATION

PRODUCT NO. : TCXD050ABLON-13

VERSION : Ver 1.1

ISSUED DATE : 2020-9-18

This module uses ROHS material

FOR CUSTOMER: _____

: APPROVAL FOR SPECIFICATION

: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optoelectronics :

Presented by	Reviewed by	Organized by
		

Note:

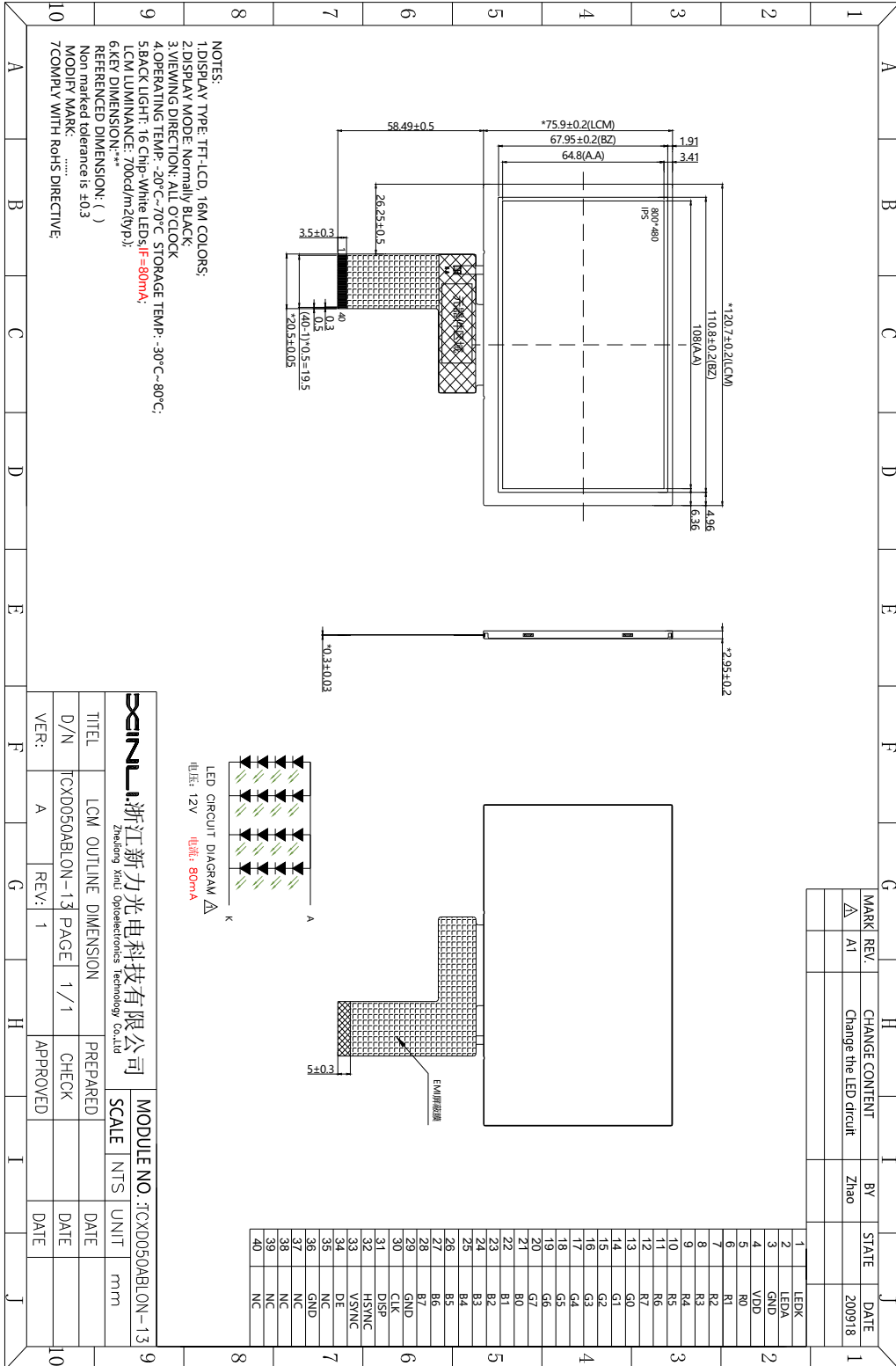
- Xinli Optoelectronics reserves the right to make changes without further notice to any products herein to improve reliability, function or design.
- All rights are reserved. No one is permitted to reproduce or duplicate the whole or part of this document without Xinli Optoelectronics' permission.

2. General Description and Features

The 5.0 inch Module named TCXD050ABLON-13 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, one Driver IC ,one FPC and one Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	120.7(H)*75.9(V)*2.95(T)	mm
(2)	LCD Active area	108(H)*64.8(V)	mm
(3)	Dot Number	800 RGB (H) x 480 (V)	/
(4)	Pixel size	0.135(H)*0.135(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16M	/
(7)	Viewing direction	ALL	O'clock
(8)	Backlight Type	16-chip	/
(9)	Power Supply	3.3(TYP)	V
(10)	Drive IC	ST7262	/
(11)	Interface type	RGB interface	/
(12)	Module weight	TBD	G

3.Mechanical Dimension



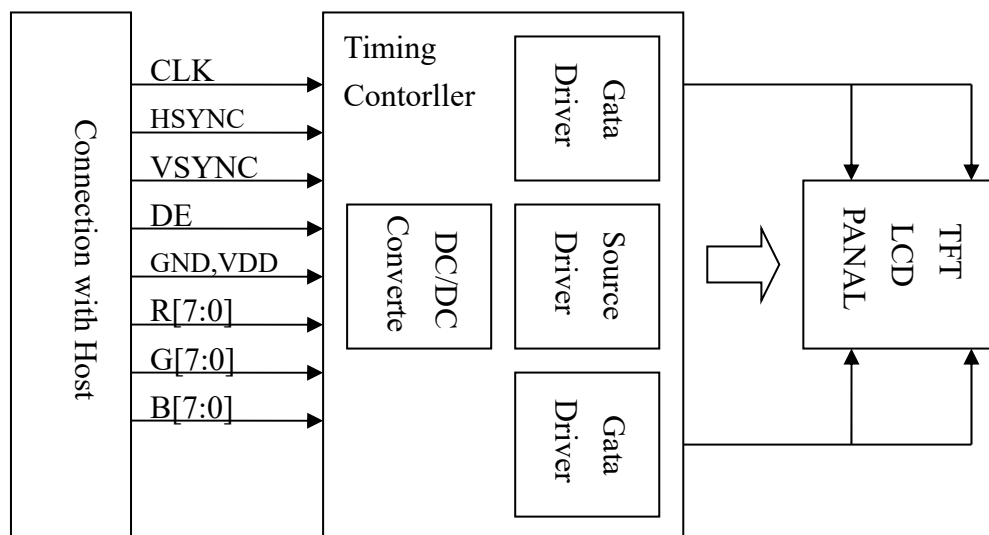
4.Interface Pin Connection

FPC Connector is used for the module electronics interface.

NO	Symbol	Level	Description
1	LEDK	K	Backlight-
2	LEDA	A	Backlight+
3	GND	P	Ground.
4	VDD	P	Power Supply.
5	R0	I	Red Data input
6	R1	I	
7	R2	I	
8	R3	I	
9	R4	I	
10	R5	I	
11	R6	I	
12	R7	I	
13	G0	I	Green Data input
14	G1	I	
15	G2	I	
16	G3	I	
17	G4	I	
18	G5	I	
19	G6	I	
20	G7	I	
21	B0	I	Blue Data input
22	B1	I	
23	B2	I	
24	B3	I	
25	B4	I	
26	B5	I	
27	B6	I	
28	B7	I	
29	GND	P	Ground.
30	CLK	I	Clock signal for data latching. Default negative polarity.

31	DISP	I	Display control / standby mode selection. Internally pulled high. DISP = “Low” : Standby; DISP = “High” : Normal display
32	HSYNC	I	Horizontal sync signal. Default negative polarity. When not used, user should connect it to “Low”.
33	VSYNC	I	Vertical sync signal. Default negative polarity. When not used, user should connect it to “Low”.
34	DE	I	Data input enable. Active high to enable the data input bus under “DE Mode “. Normally pull low.
35	NC	-	Not connect.
36	GND	P	Ground.
37	NC	-	Not connect.
38	NC	-	Not connect.
39	NC	-	Not connect.
40	NC	-	Not connect.

5. Block Diagram



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature(Humidity)	Top	-20 to 70	°C
Storage temperature(Humidity)	Tst	-30 to 80	°C
power supply	VDD	-0.3 ~ 4.0	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

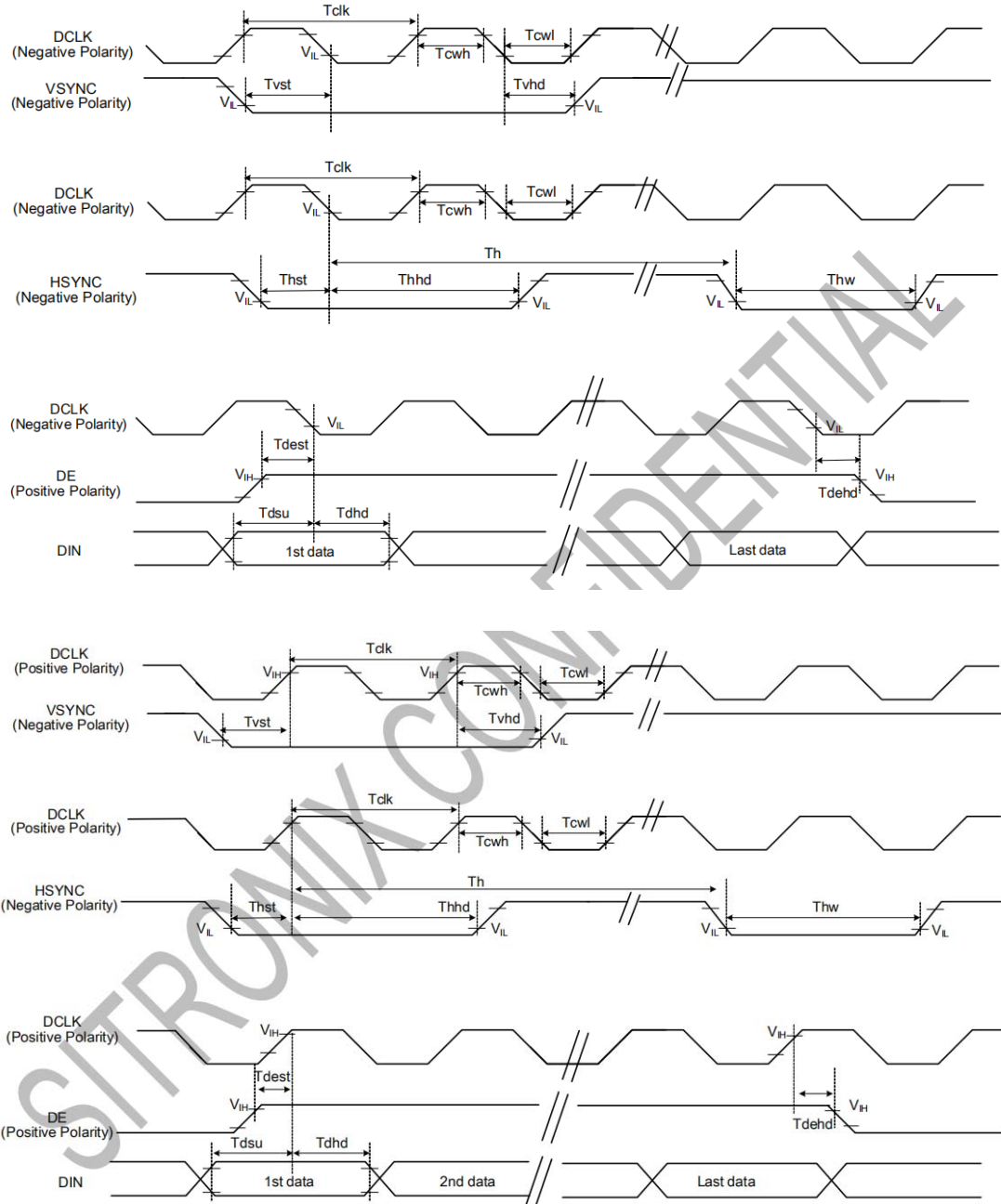
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply	VDD	-	3.1	3.3	3.6	V
Logic input signal Voltage	H level	V_{IH}	$0.7*VDD$	-	VDD	V
	L level	V_{IL}	GND	-	$0.3*VDD$	V

8. Backlight Characteristics

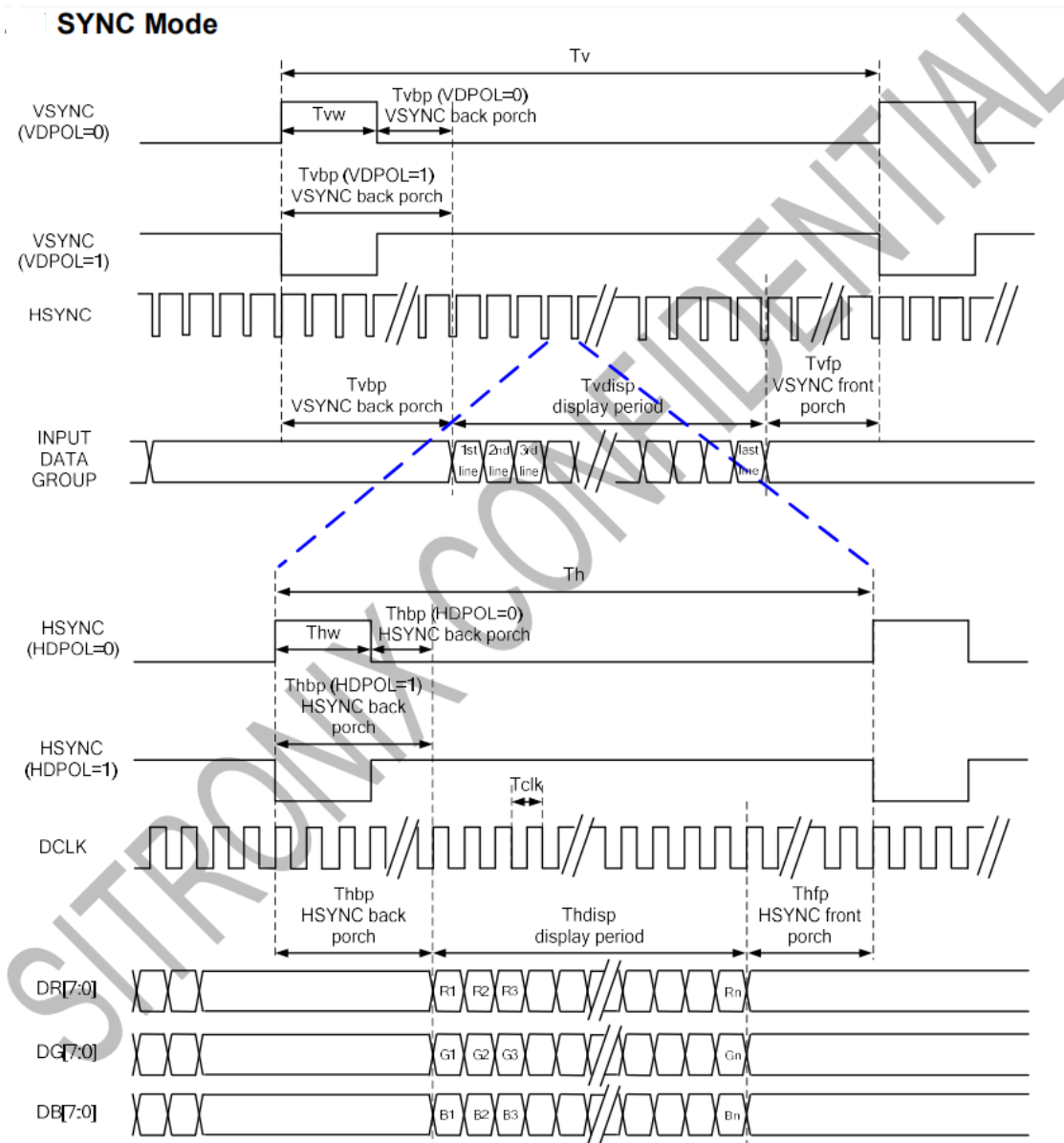
Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	10.8	12	13.6	V	IF=80mA
Number of LED	-	16			pcs	-
Power Consumption	PWF	864	960	1088	mW	-
LED life-span	-	-	(20000)	-	Hrs	-

9. Electrical Characteristics

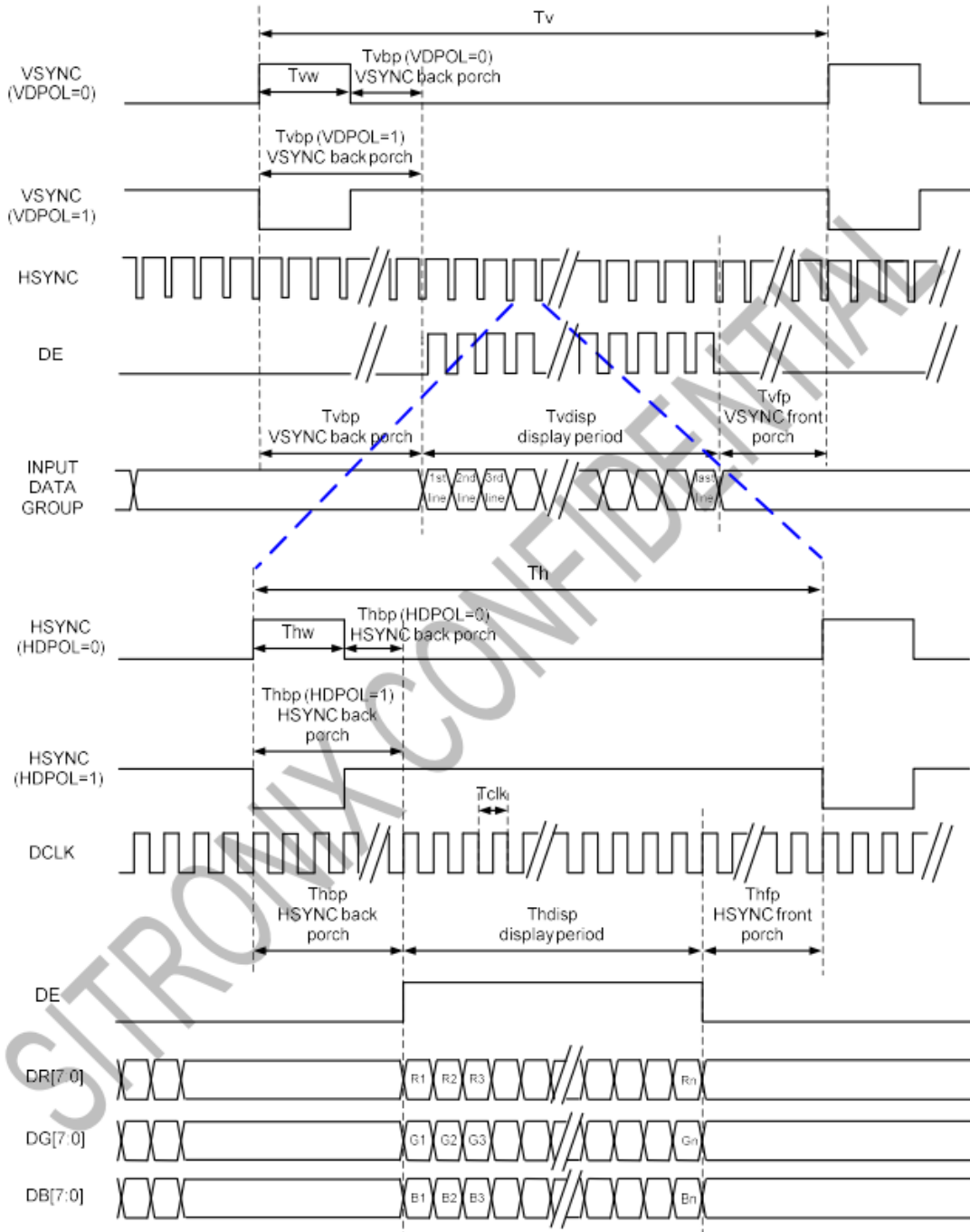
System Bus Timing for RGB Interface



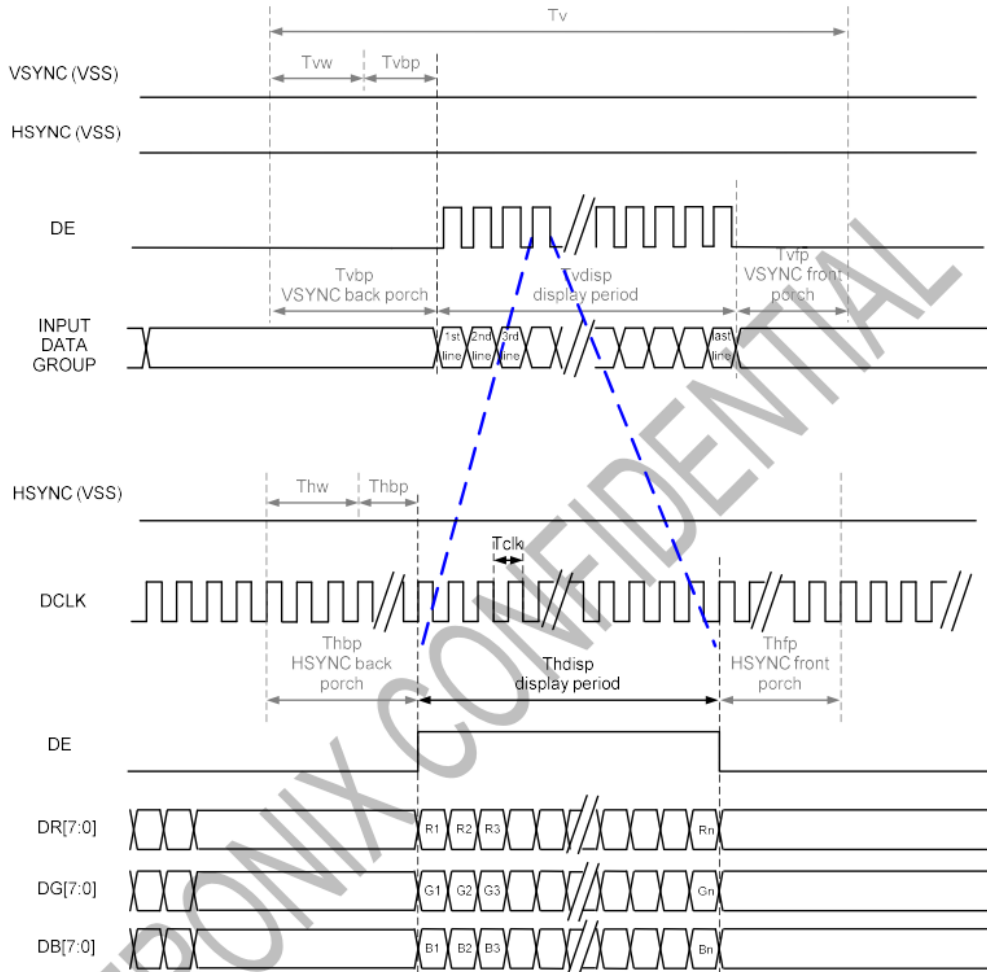
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	T _{cw}	40	50	60	%	
VSYNC Setup Time	T _{vst}	-	-	10	ns	
VSYNC Hold Time	T _{vhd}	-	-	10	ns	
HSYNC Setup Time	T _{hst}	-	-	10	ns	
HSYNC Hold Time	T _{hhd}	-	-	10	ns	
Data Setup Time	T _{dsu}	-	-	10	ns	
Data Hold Time	T _{dhd}	-	-	10	ns	
DE Setup Time	T _{dest}	-	-	10	ns	
DE Hold Time	T _{d ehd}	-	-	10	ns	



SYNC-DE Mode



DE Mode



Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency	Fclk	23	25	27	MHz	
HSYNC	Period Time	T_h	-	816	896	DCLK
	Display Period	T_{hdisp}	800		DCLK	
	Back Porch	T_{hbp}	-	8	48	DCLK
	Front Porch	T_{hfp}	-	8	48	DCLK
	Pulse Width	T_{hw}	-	4	8	DCLK
VSYNC	Period Time	T_v	-	496	504	HSYNC
	Display Period	T_{vdisp}	480		HSYNC	
	Back Porch	T_{vbp}	-	8	12	HSYNC
	Front Porch	T_{vfp}	-	8	12	HSYNC
	Pulse Width	T_{vw}	-	4	8	HSYNC

Note: The minimum blanking time depends on the GIP timing of the panel specification.

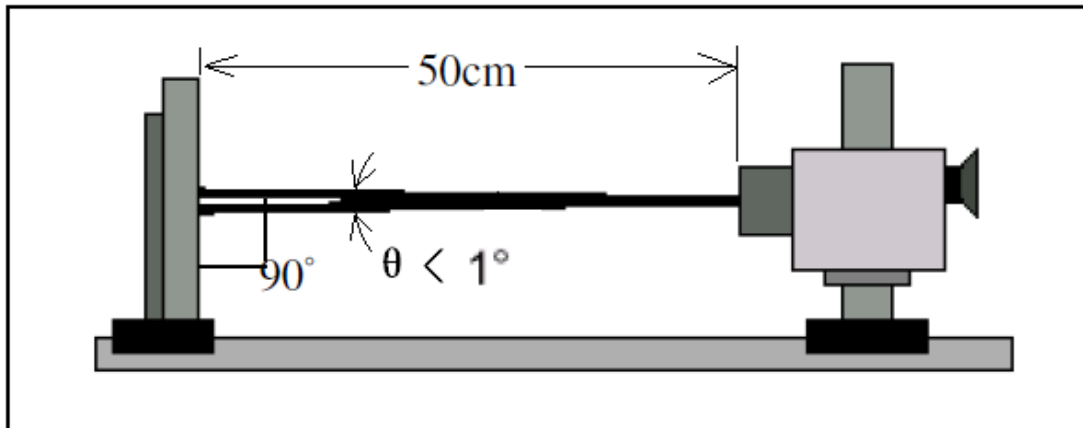
10. Electro-Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Note	
Response time	Tr+Tf	$\theta = 0$	-	30	40	ms	4	
Uniformity (Five point)	δ WHITE	$\theta = 0$ Ta=25°C	-	80	-	%	7	
Contrast ratio	Cr		800	1000	-	-	3,5	
Surface Luminance	Lv		-	700	-	-	3,7	
Viewing angle range	Hor.	ΘL	CR>10	70	80	-	deg	6
		ΘR		70	80	-	deg	
	Ver.	ΘU		70	80	-	deg	
		ΘD		70	80	-	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°C±2°C

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

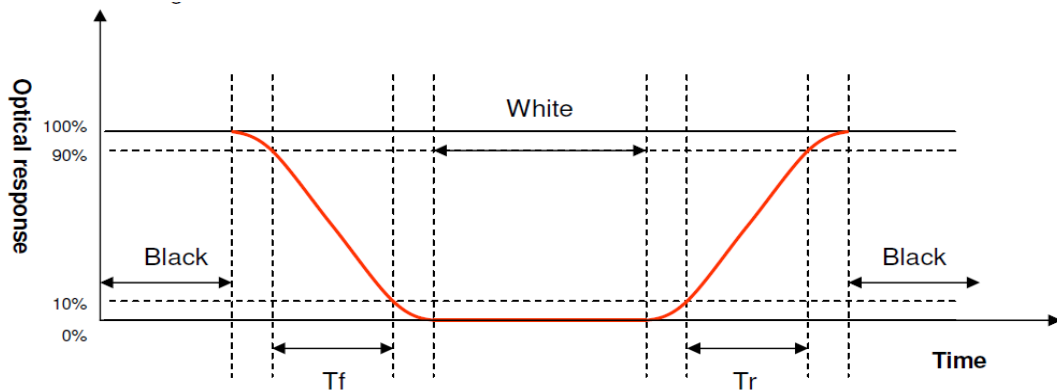
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



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:

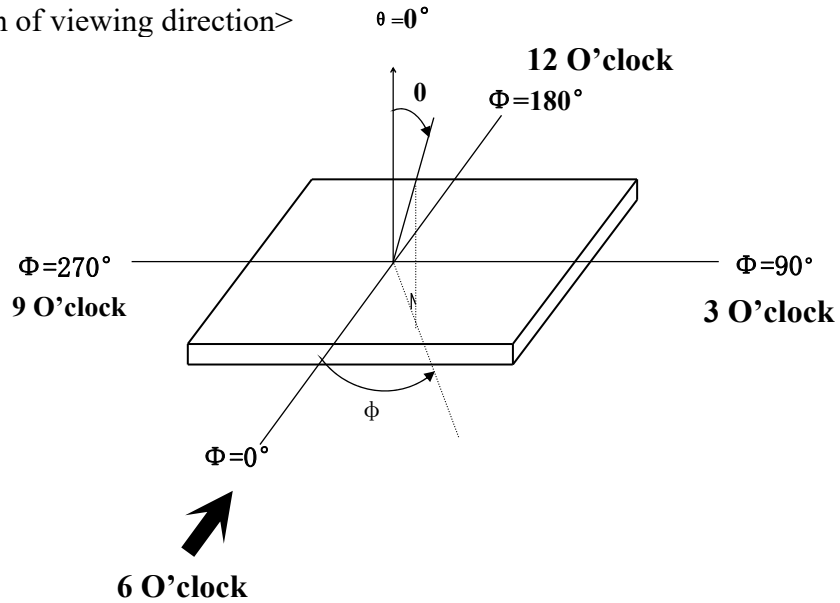
Contrast ratio is calculated with the following formula:

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

Note 6. Definition of viewing angle

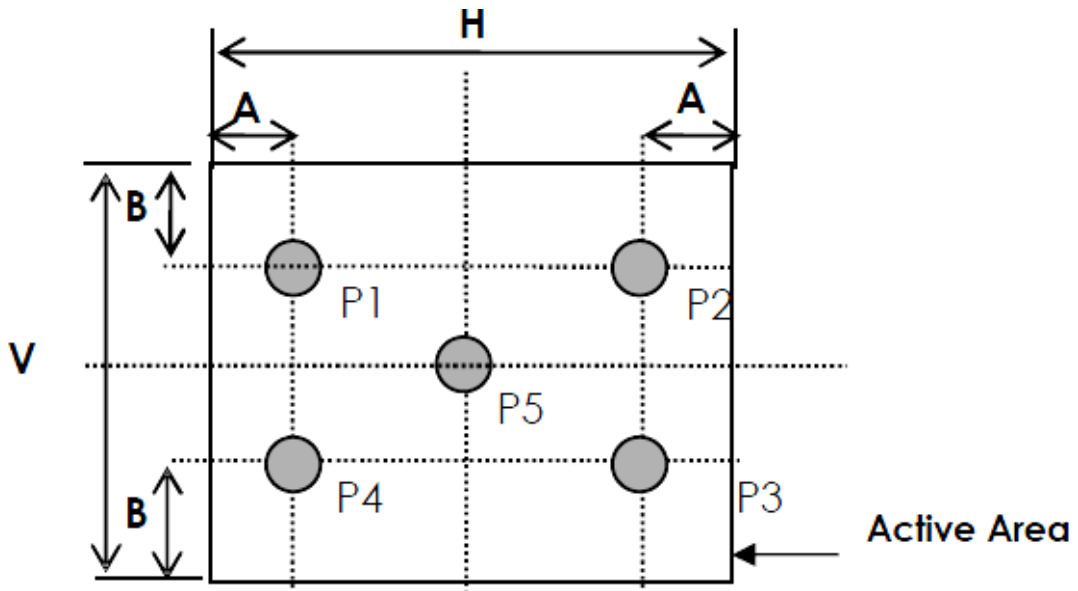
Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

<Definition of viewing direction>



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 $\Phi=7\text{mm}$, 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%

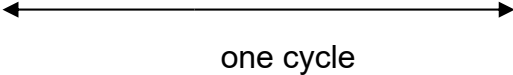
L_v = Surface Luminance with all white pixels (P5)

11. Quality Assurance

TBD.

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.

N O.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80°C, 240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30°C, 240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70°C, 240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20°C, 240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60°C, 90% RH, 240H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle -20°C ← → 25°C ← → 70°C 30min ← → 5min ← → 30min 	-20°C/70°C, 10 cycles
7	ESD Test	To check the product operating capability after electrostatic environment.	Voltage: ± 2KV (contact discharge); ±4 KV (air discharge) C: 330PF; R: 330 Ω

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 handling 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°C and 35 °C and at normal humidity. Avoid high temperature, high humidity or temperature below 0°C.
- (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.