

SPECIFICATION

PRODUCT NO. : X080DTLN-C01

VERSION : Ver 1.2

ISSUED DATE : 2019-3-1

This module uses ROHS material

FOR CUSTOMER : _____

☐: APPROVAL FOR SPECIFICATION

☐: APPROVAL FOR SAMPLE

DATE	APPROVED BY

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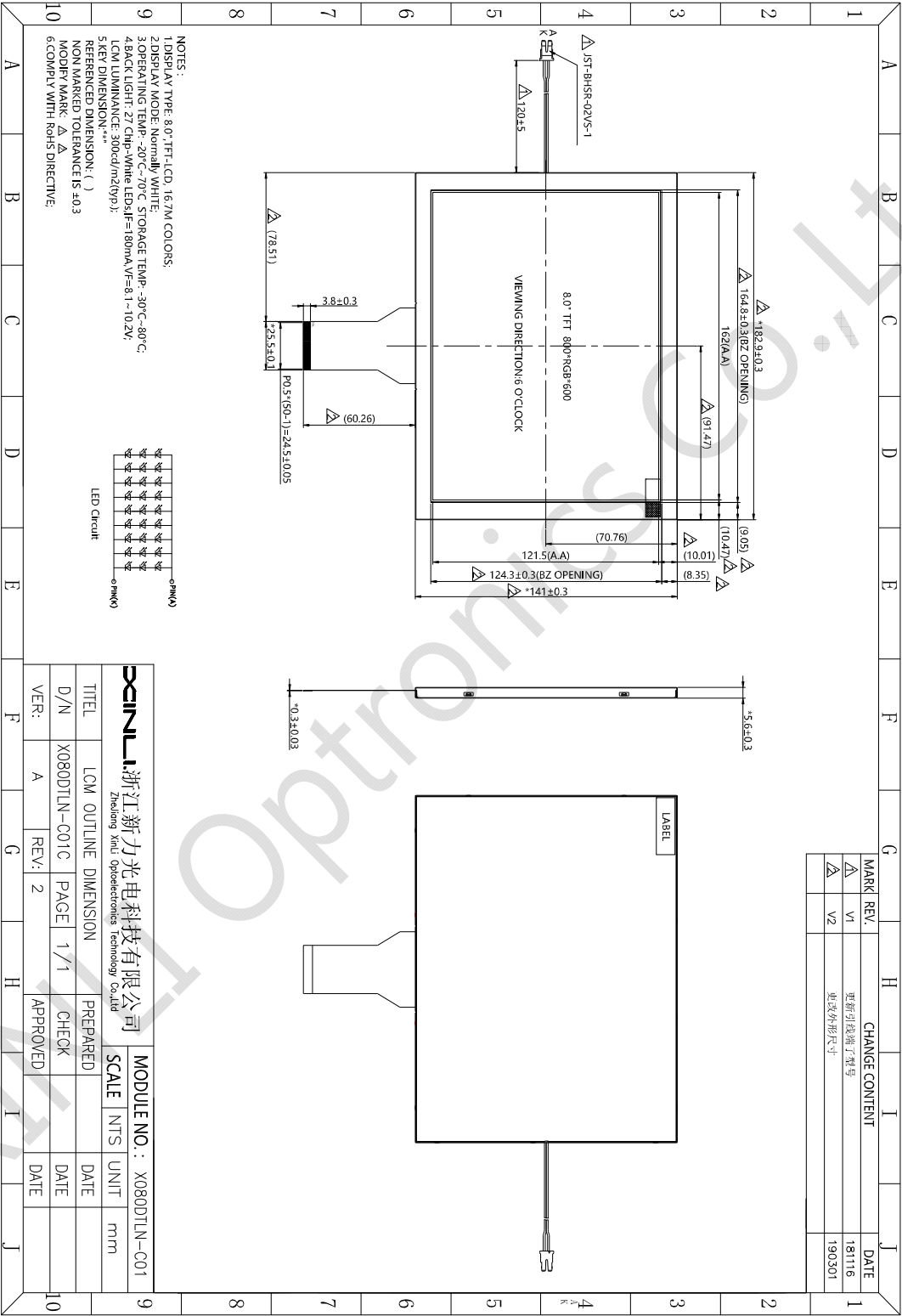
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2. General Description and Features

The 8.0 inch Module named X080DTLN-C01 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	182.9*141*5.6	mm
(2)	LCD Active area	162*121.5	mm
(3)	Dot Number	800*RGB*600	/
(4)	Pixel pitch	0.2025x0.2025	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction (Gray inversion)	6 O'clock	O'clock
(8)	Interface	TTL	/
(9)	Interface type	ZIF,0.5Pitch_50pin	/

3. Mechanical Dimension



4. Interface Pin Connection

FPC Connector is used for the module electronics interface.

1. FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	NC		No connection	
2	NC		No connection	
3	NC		No connection	
4	NC		No connection	
5	GND	P	Power ground	
6	V _{COM}	I	Common voltage	
7	V _{CC}	P	Power for Digital circuit	
8	MODE	I	DE/SYNC mode select	Note3
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	
19	B0	I	Blue data(LSB)	
20	G7	I	Green data (MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	
26	G1	I	Green data	
27	G0	I	Green data (LSB)	
28	R7	I	Red data (MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	

32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	
35	R0	I	Red data (LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	L/R	I	Right/ left selection	Note2,5
40	U/D	I	Up/down selection	Note2,5
41	V _{GH}	P	Gate ON voltage	
42	V _{GL}	P	Gate OFF voltage	
43	AV _{DD}	P	Power for Analog circuit	
44	RESET	I	Global reset pin.	Note1
45	NC		No connection	
46	V _{COM}	I	Common voltage	
47	DITHB	I	Dithering function	Note 4
48	GND	P	Power ground	
49	NC		No connection	
50	NC		No connection	

I: input, O: output, P: Power

Note 1: Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.

Note 2: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	R/L	
GND	V _{CC}	Up to down, left to right
V _{CC}	GND	Down to up, right to left
GND	GND	Up to down, right to left
V _{CC}	V _{CC}	Down to up, left to right

Note 3: DE/SYNC mode select, Normally pull high.

H: DE mode.

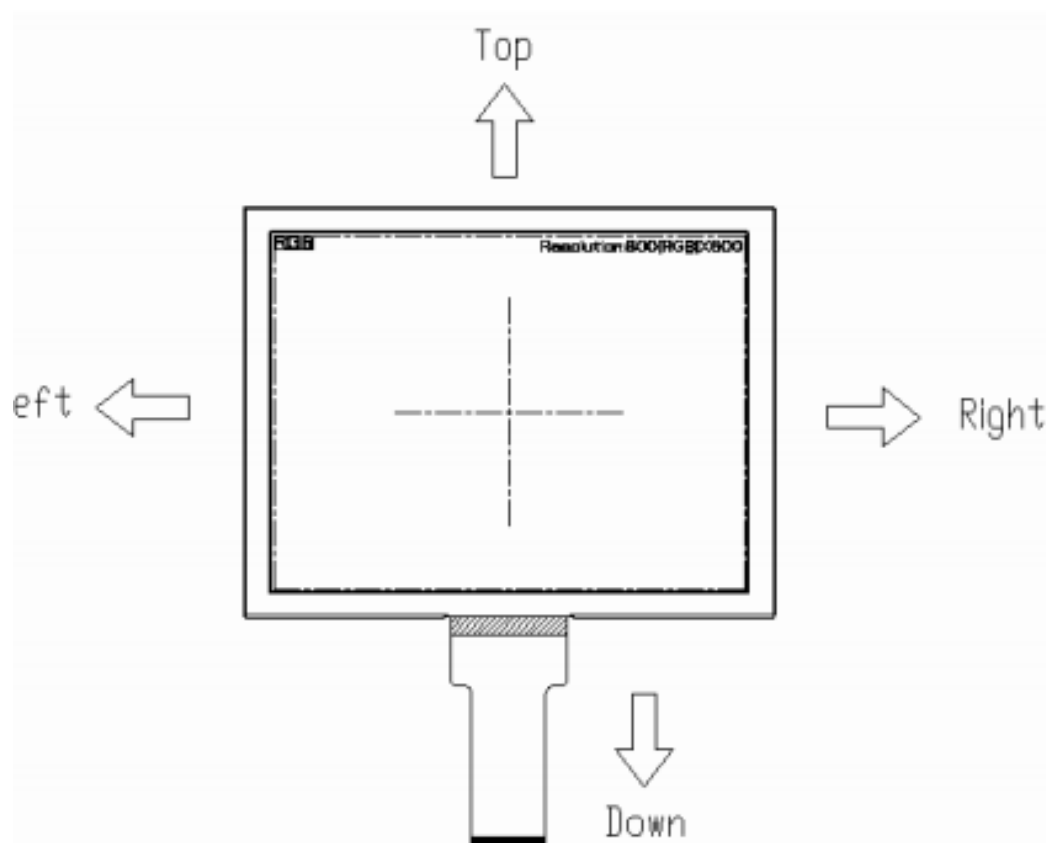
L: HS/VS mode.

Note4: Dithering function enable control. Normally pull high.

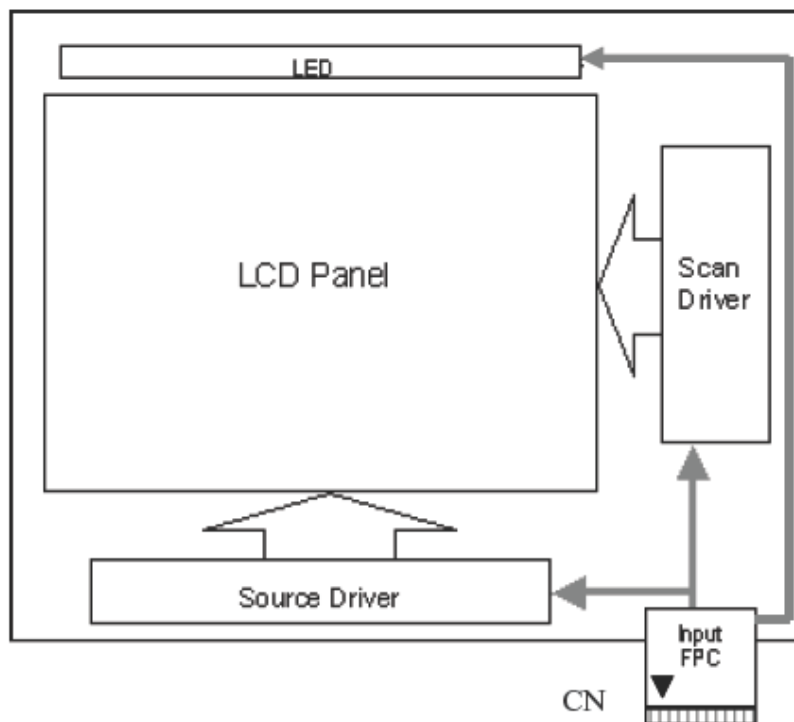
DITHB="1", Disable internal dithering function. For 18bit RGB interface, connect two LSB bits of all the R/G/B data buses to GND.

DITHB="0", Enable internal dithering function, For TTL 24bit parallel RGB image data input.

Note 5: Definition of scanning direction.
Refer to the figure as below:



5. Block Diagram



6. Maximum Rating

(GND=AV_{SS}=0V, Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V _{CC}	-0.3	5.0	V	
	AV _{DD}	-0.5	13.5	V	
	V _{GH}	13.0	19.0	V	
	V _{GL}	-12.0	-2.0	V	
	V _{GH} -V _{GL}	-	31.0	V	
Operation Temperature Storage Temperature	T _{OP}	-20	70	°C	
	T _{ST}	-30	80	°C	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

7. Electrical Characteristics

(GND=AV_{SS}=0V, Note 1)

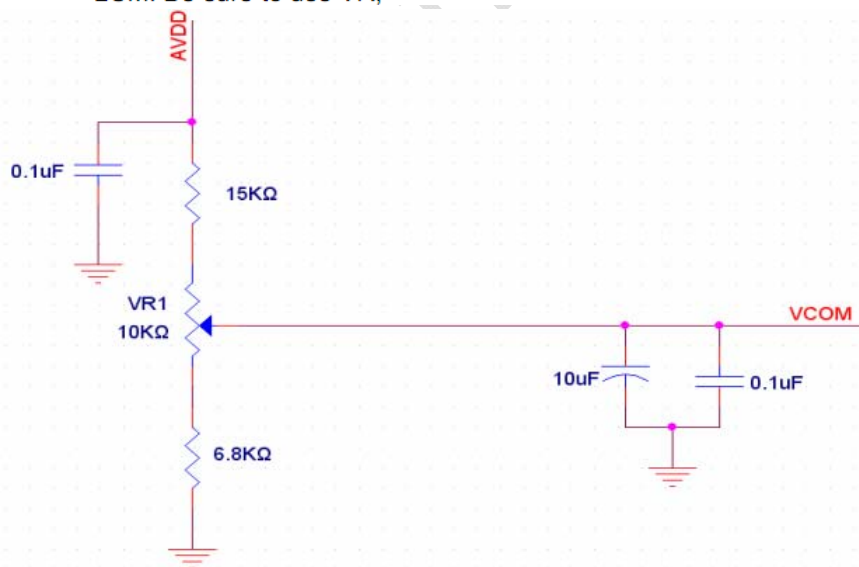
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V _{CC}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	10.2	10.4	10.6	V	
	V _{GH}	15.3	16.0	16.7	V	
	V _{GL}	-7.7	-7.0	-6.3	V	
Input signal voltage	V _{COM}	2.8	3.8	4.8	V	Note 4
Input logic high voltage	V _{IH}	0.7V _{CC}	-	V _{CC}	V	Note 3
Input logic low voltage	V _{IL}	0	-	0.3V _{CC}	V	

Note 1: Be sure to apply V_{CC} and V_{GL} to the LCD first, and then apply V_{GH}.

Note 2: V_{CC} setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK, HS, VS, RSTB, UPDN, STLR, MODE, DITHB.

Note 4: Typical V_{COM} is only a reference value, it must be optimized according to each LCM. Be sure to use VR;

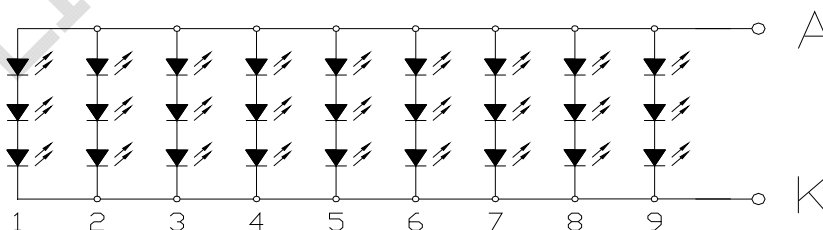


(GND=AV_{SS}=0V)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	-	0.2	0.5	mA	V _{GH} = 16.0V
	I _{GL}	-	0.2	1.0	mA	V _{GL} = -7.0V
	I _{CC}	-	5.5	10.0	mA	V _{CC} = 3.3V
	I _{AVDD}	-	32.0	50.0	mA	AV _{DD} = 10.4V

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	V _f	-	9.6	-	V	I _F =180mA
Number of LED	-	27			pcs	-
Power Consumption	P _{WF}	-	1728	-	mW	-
LED life-span	-	-	(20000)	-	Hrs	-

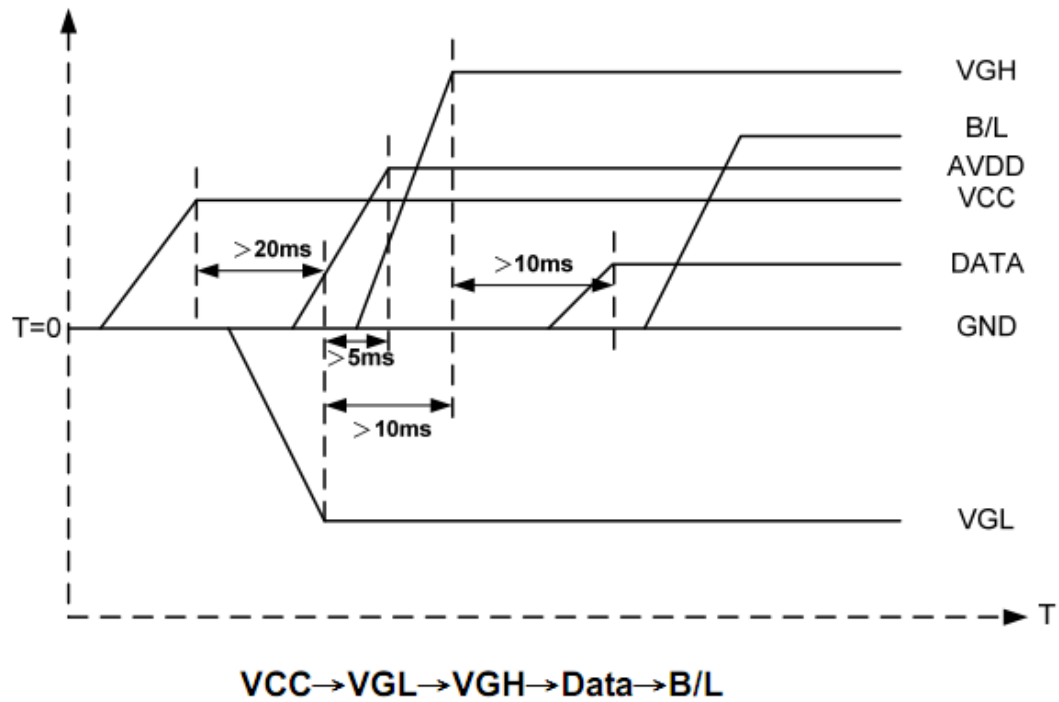


Backlight circuit

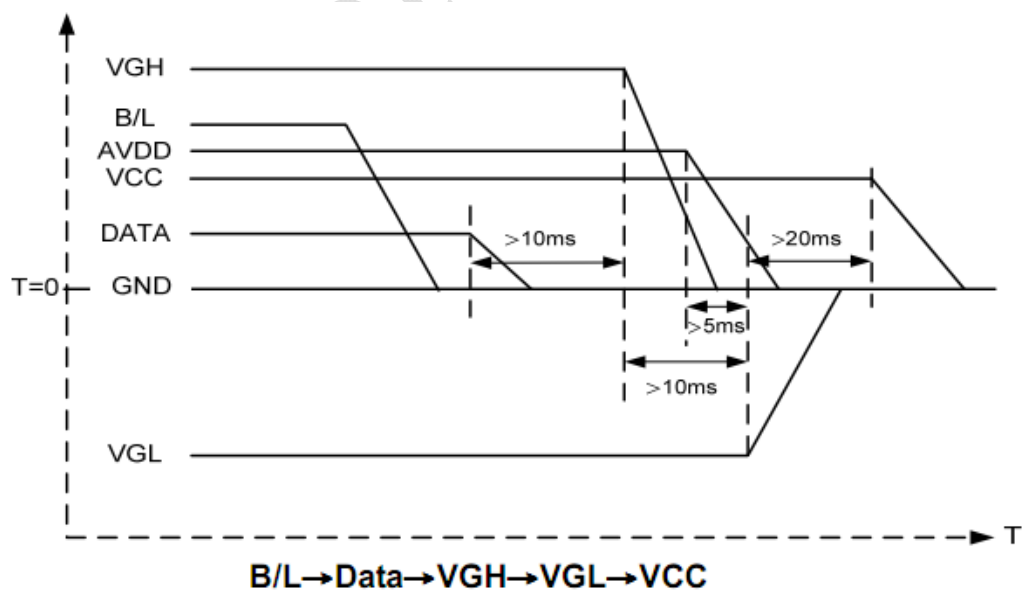
V_F=9.0V(typ.) I_F=180mA

9. Timing Characteristics

9.1 Power-on



9.2 Power-off



Note: Data include R0~R5, B0~B5, GO~G5, STLR,UPDN, DCLK, HS,VS,DE.

9.3 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	Ns	
HS hold time	T_{hhd}	8	-	-	Ns	
VS setup time	T_{vst}	8	-	-	Ns	
VS hold time	T_{vhd}	8	-	-	Ns	
Data setup time	T_{dsu}	8	-	-	Ns	
Data hole time	T_{dhd}	8	-	-	Ns	
DE setup time	T_{esu}	8	-	-	Ns	
DE hole time	T_{ehd}	8	-	-	Ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	10	-	-	us	
CLKIN cycle time	T_{coh}	20	-	-	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	

9.4 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

9.5 Timing Diagram

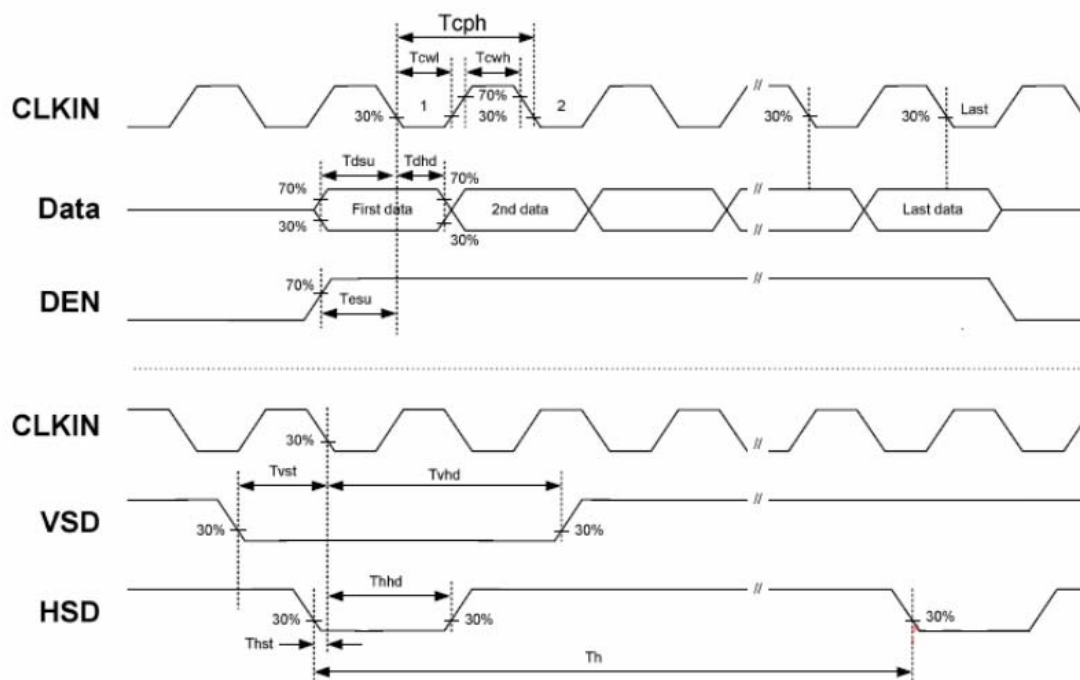
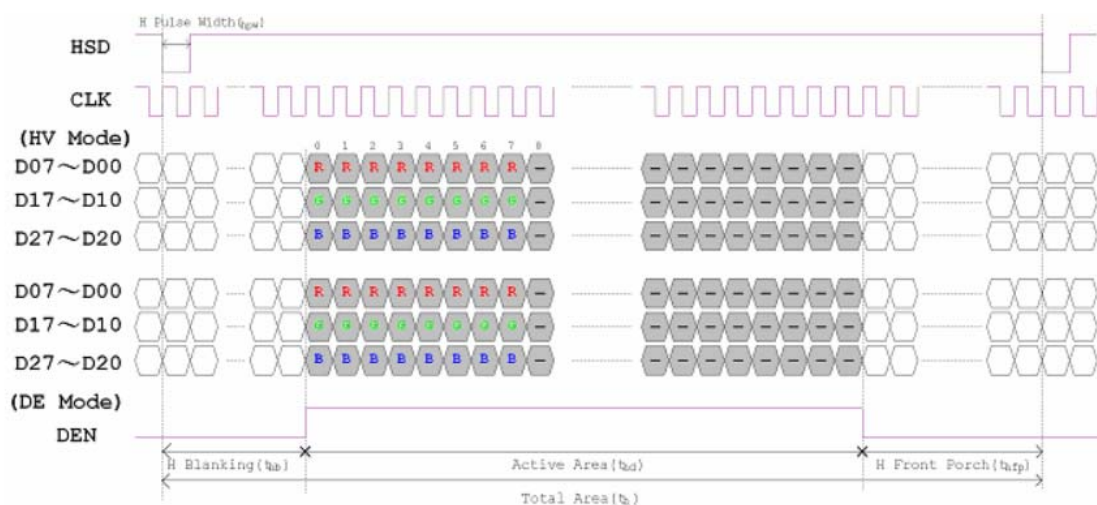


Figure 3.1 Input Clock and Data Timing Diagram



10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

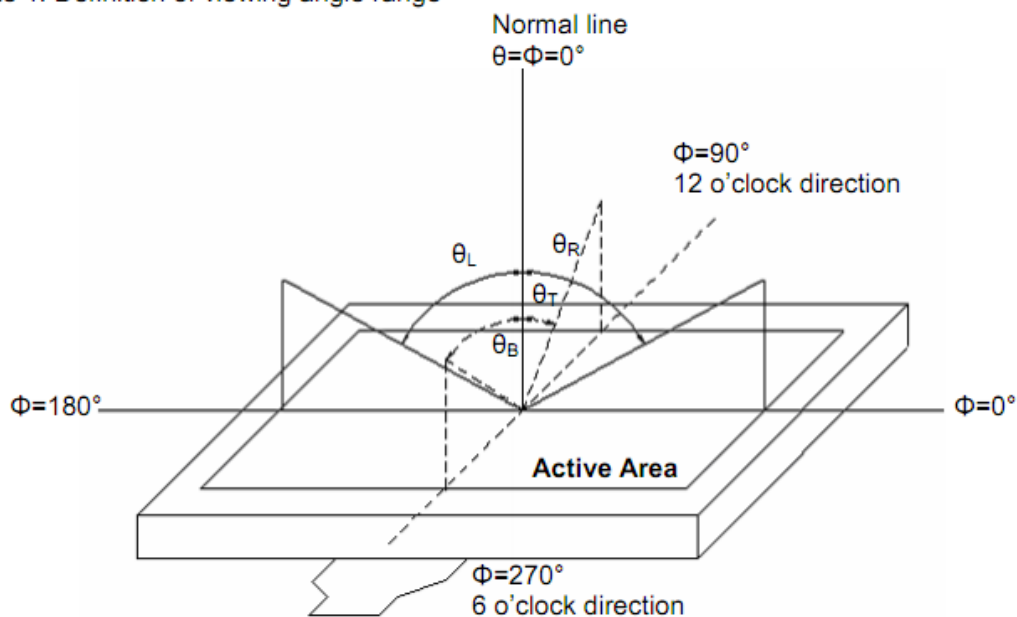
Please consult our technical department for detail information.

12. Electro-Optical Characteristics

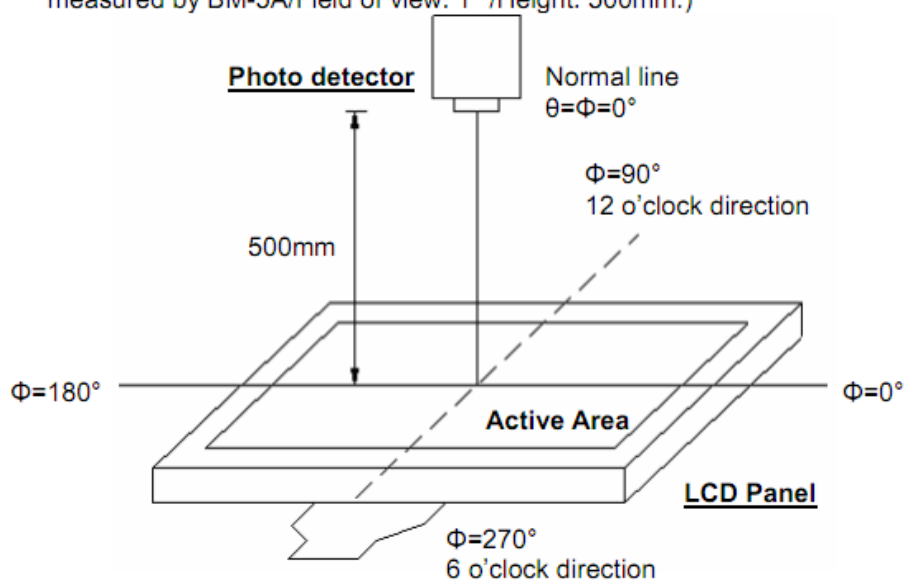
Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Transmission (with pol)		T		4.82	5.49	-	%	
Response time		Tr	$\theta = 0^\circ$	-	10	20	ms	3
		Tf	$\theta = 0^\circ$	-	15	30	ms	
Contrast ratio		Cr	$T_a = 25^\circ\text{C}$	400	500	-	-	4
Surface Luminance		Lv			300			2
Viewing angle range		θ	$\theta = 90^\circ$	40	50	-	deg	1
			$\theta = 270^\circ$	60	70	-	deg	
			$\theta = 0^\circ$	60	70	-	deg	
			$\theta = 180^\circ$	60	70	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0^\circ$	0.26	0.31	0.36	-	2
		Y		0.28	0.33	0.38	-	5

Test Conditions:

1. $V_{CC}=3.3V$, the ambient temperature is $25^{\circ}C$.
2. The test systems refer to Note 2.

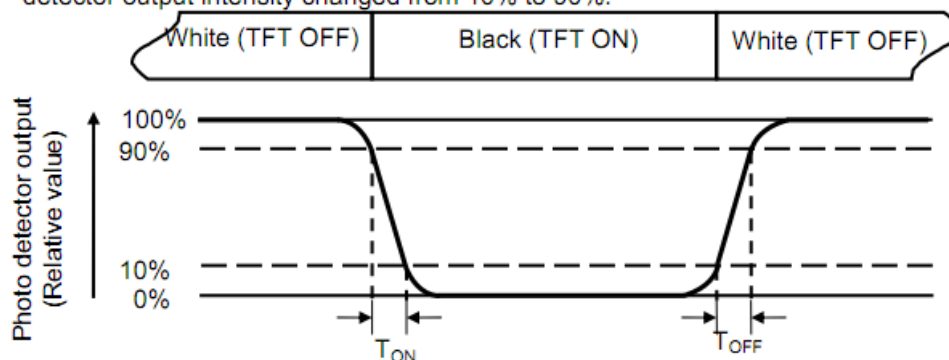
Note 1: Definition of viewing angle range**Note 2: Definition of optical measurement system.**

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/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%.

**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.

13. 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°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	40°C,90% RH, 240H

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 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.

15. Package Specification

TBD