PRODUCT SPECIFICATIONS

For Customer: _____   ☐ : APPROVAL FOR SPECIFICATION

Customer Model No. _____   ☐ : APPROVAL FOR SAMPLE

Module No.: _____ *ZW-T101HIEWA-03* _____   _Date : 2023.6.7_

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For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	APPROVER
YZJ		

2. Revision Record

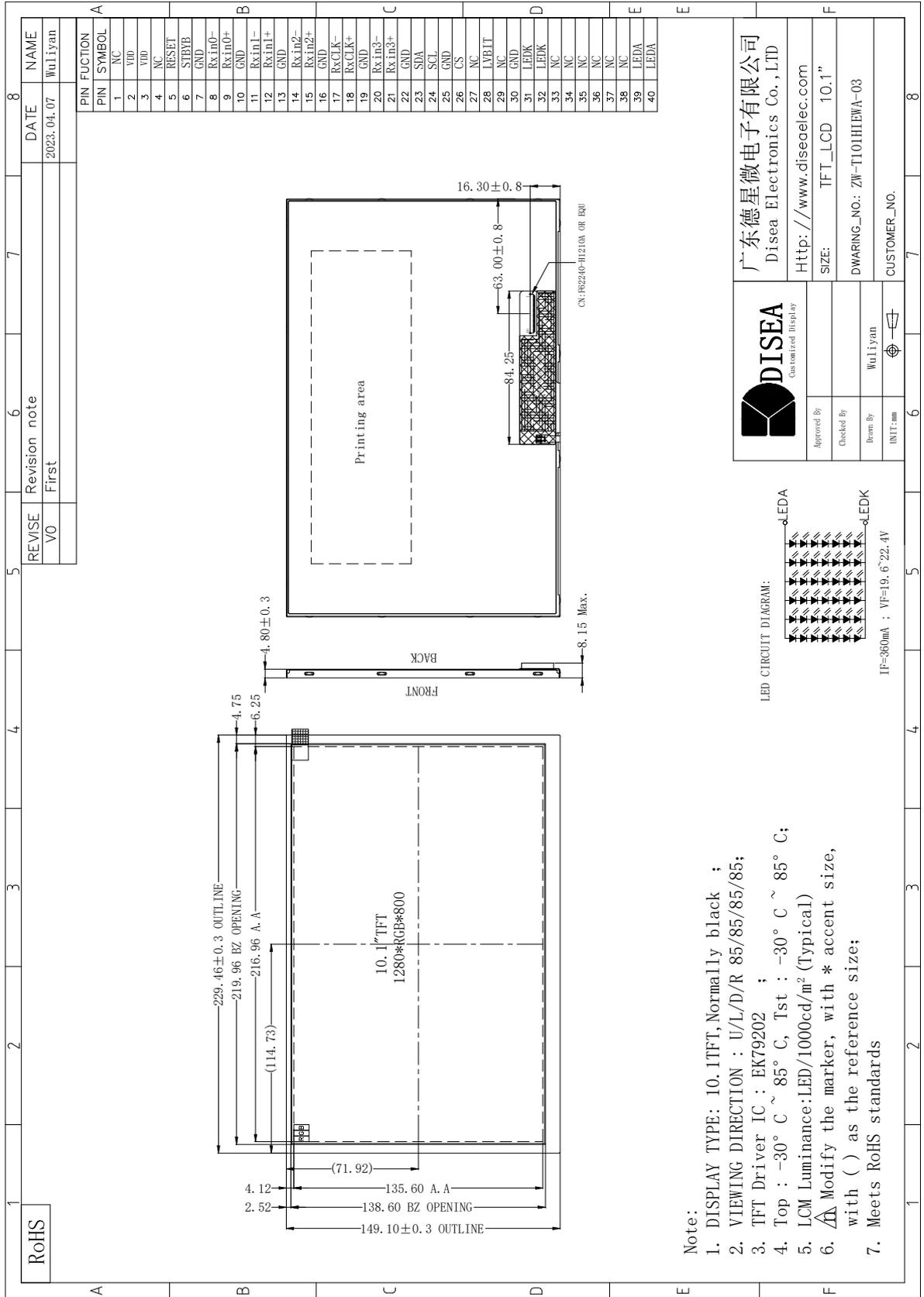| Date	Rev.No.	Page	Revision Items	Prepared
2023.05.22	V0		The first release	YZJ
2023.06.07	V1		Update optical parameters	YZJ

3. General Specifications

ZW-T101HIEWA-03 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC,a back light unit. The 10.1´´ display area contains 1280x800 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	ALL	O'Clock	
Operating temperature	-30~+85	℃	
Storage temperature	-30~+85	℃	
Module size	Refer to outline drawing	mm	
Active Area(W×H)	216.96X135.60	mm	
Number of Dots	1280×800	dots	
Driver IC	EK79202	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	Refer to outline drawing	-	
Backlight	7S6P-LEDs (white)	pcs	
Interface	LVDS	-	

4.Outline.Drawing

PIN	FUCTION SYMBOL
1	NC
2	VDD
3	VDD
4	NC
5	RESET
6	STBYB
7	GND
8	Rxin0-
9	Rxin0+
10	GND
11	Rxin1-
12	Rxin1+
13	GND
14	Rxin2-
15	Rxin2+
16	GND
17	RxCLK-
18	RxCLK+
19	GND
20	Rxin3-
21	Rxin3+
22	GND
23	SDA
24	SCL
25	GND
26	CS
27	NC
28	LVBTT
29	NC
30	GND
31	LEDK
32	LEDK
33	NC
34	NC
35	NC
36	NC
37	NC
38	NC
39	LEDA
40	LEDA

REVISE	Revision note	DATE	NAME
V0	First	2023.04.07	Wuliyan

广东德星微电子有限公司
Disea Electronics Co.,LTD

Http://www.diseaelec.com

SIZE: TFT_LCD 10.1"

DWARING_NO.: ZW-T101HIEWA-03

CUSTOMER_NO.

DISEA
Customized Display

Approved By
Checked By
Drawn By   Wuliyan
UNIT:mm

LED CIRCUIT DIAGRAM:

IF=360mA ; VF=19.6~22.4V

10.1"TFT
1280*RGB*800

Printing area

16.30±0.8
63.00±0.8
84.25
4.80±0.3
8.15 Max.
BACK
FRONT
CN:F62240-H1210A OR EQU

4.75
6.25
229.46±0.3 OUTLINE
219.96 BZ OPENING
216.96 A.A
(114.73)
(71.92)
4.12
2.52
135.60 A.A
138.60 BZ OPENING
149.10±0.3 OUTLINE

Note:
1. DISPLAY TYPE: 10.1TFT,Normally black ;
2. VIEWING DIRECTION : U/L/D/R 85/85/85/85;
3. TFT Driver IC : EK79202 ;
4. Top : -30° C ~ 85° C, Tst : -30° C ~ 85° C;
5. LCM Luminance:LED/1000cd/m² (Typical)
6. Modify the marker, with * accent size, with ( ) as the reference size;
7. Meets RoHS standards

RoHS

5. Absolute Maximum Ratings(Ta=25℃)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	2.3	3.6	V	1，2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module

within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor

reliability.

2. V_{DD} >V_{SS} must be maintained.

3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	-30℃	85℃	-30℃	85℃
Humidity	-	-	-	-

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.

The phenomenon is reversible.

3. Ta<=40℃:85%RH MAX.

Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.
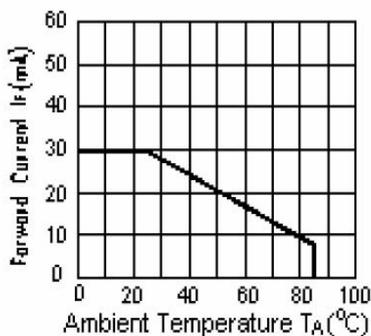
ILED VS TEMP

6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics(Vss=0V ,Ta=25℃)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	Ta=25℃	3.0	3.3	3.6	V	
Input voltage	'H'	V_{IH}	V_{DD}=3.3V	$0.7V_{DD}$	-	V_{DD}	V	
	'L'	V_{IL}	V_{DD}=3.3V	0	-	$0.3V_{DD}$	V	

Note: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded. Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

6.2 LED backlight specification(VSS=0V ,Ta=25℃)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage VLED	V_f	If=360mA	19.6	21	22.4	V	
Uniformity	△Bp	If=360mA	70	-	-	%	
LED Life Time	-	-	20000	-	-	hr	1

Note 1:   Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

6.3 Interface signals

6.3.1 LCM PIN

Pin No.	Symbol	I/O	Function
1	NC		No Connection
2-3	VCC	P	Power for digital circuit
4	NC		No Connection
5	RESET	I	Global reset pin
6	STBYB	I	Stand mode: SBYB=1,normal operation SBYB=0,timing control,source driver will turn off,all output are high-Z
7	GND	P	Ground
8	Rxin0-	I	-LVDS differential data input
9	Rxin0+	I	+LVDS differential data input
10	GND	P	Ground
11	Rxin1-	I	-LVDS differential data input
12	Rxin1+	I	+LVDS differential data input
13	GND	P	Ground
14	Rxin2-	I	-LVDS differential data input
15	Rxin2+	I	+LVDS differential data input
16	GND	P	Ground
17	RxCLK-	I	-LVDS differential clock input
18	RxCLK+	I	+LVDS differential clock input
19	GND	P	Ground
20	Rxin3-	I	-LVDS differential data input
21	Rxin3+	I	+LVDS differential data input
22	GND	P	Ground
23	SDA	I	Serial communication data input.
24	SCL	I	Serial communication clock input.
25	GND	P	Ground
26	CS	I	Chip select signal
27	NC		No Connection

28	LVBIT	I	6-bit / 8-bit input select for LVDS mode. **Normally pull high.** (only for LVDS, MIPI Mode = Dummy)

LVBIT	Function
H	8-bit (default)
L	6-bit

29	NC		No Connection
30	GND	P	Ground
31-32	LEDK	P	LED back light(Cathode)
33-38	NC		No Connection
39-40	LEDA	P	LED back light(Anode)

6.4 Power Sequence

Power on :
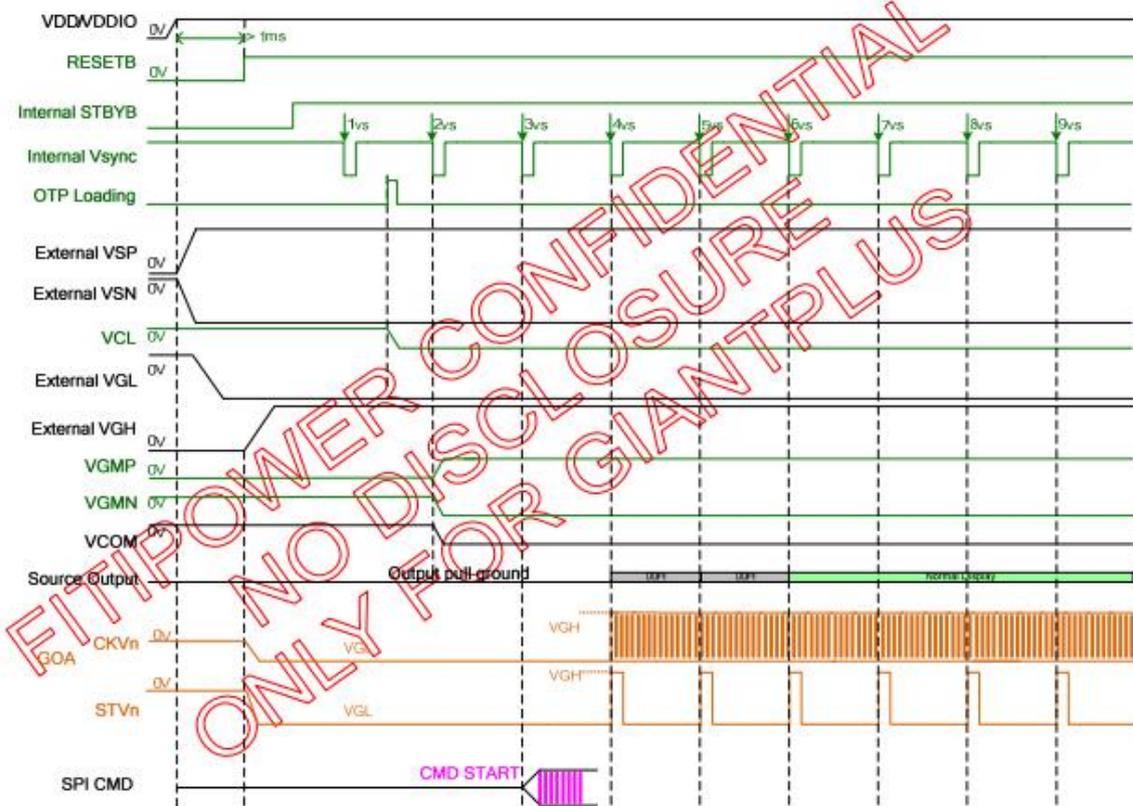
Power off:
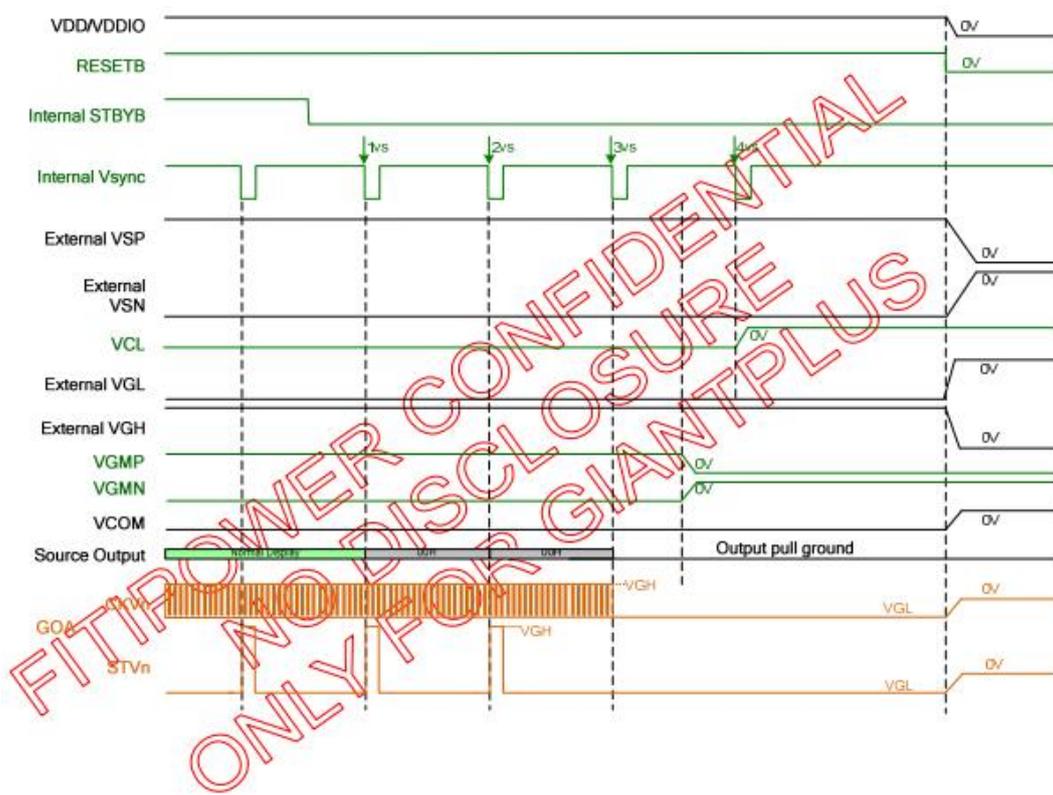
6.5 Timing Characteristics

6.5.1 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
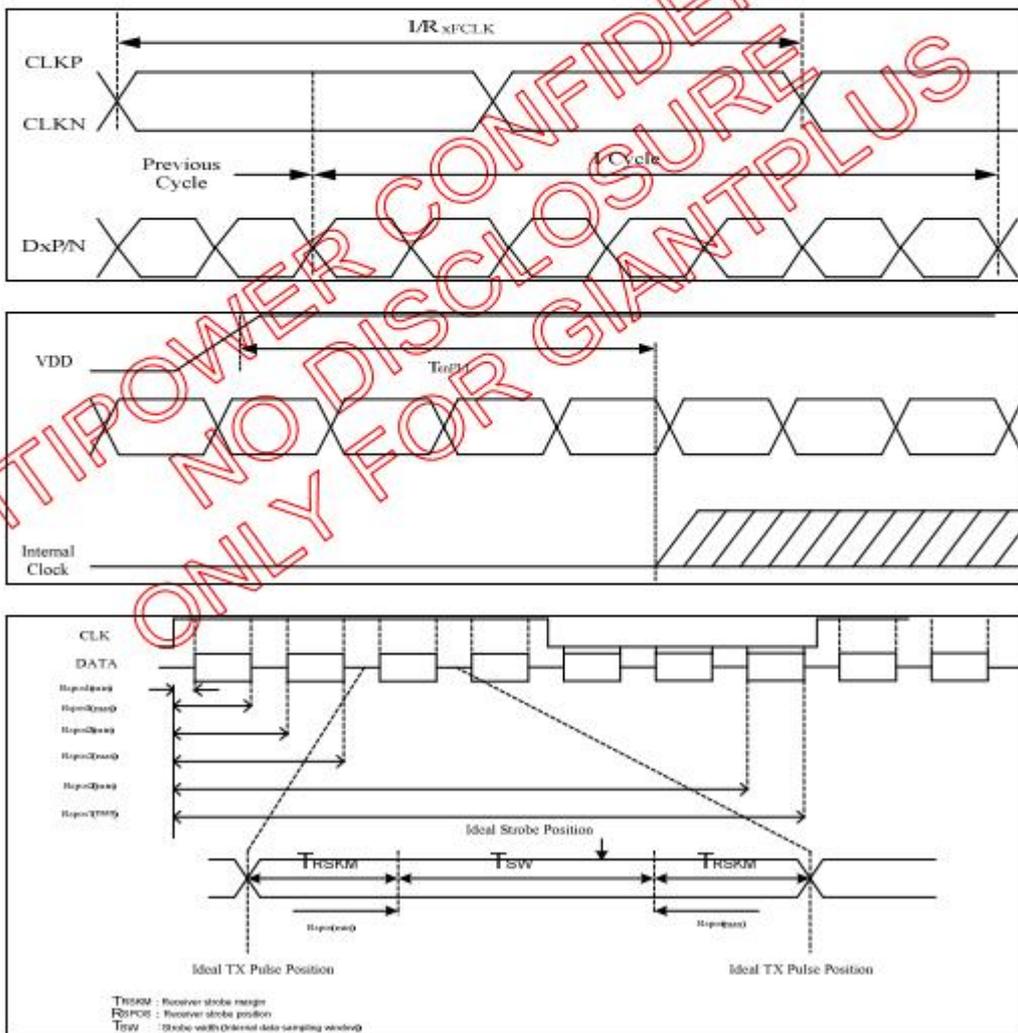
6.6.2 Timing Diagram

6.6.2.1   Data Input Format

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)
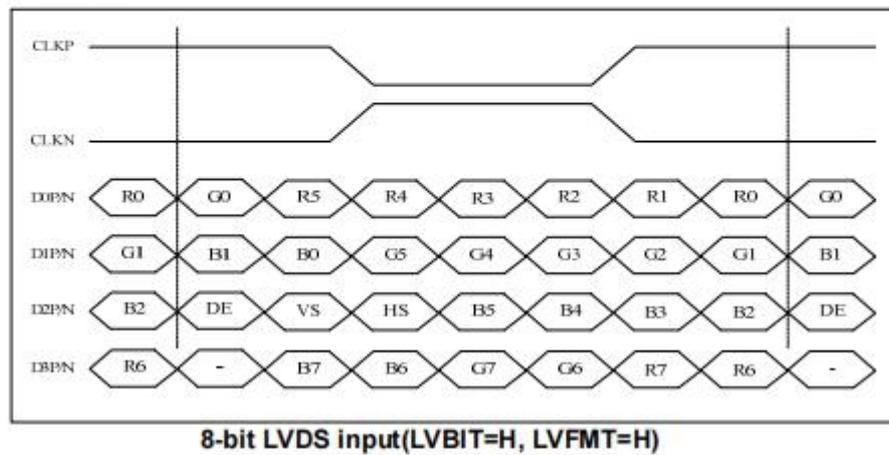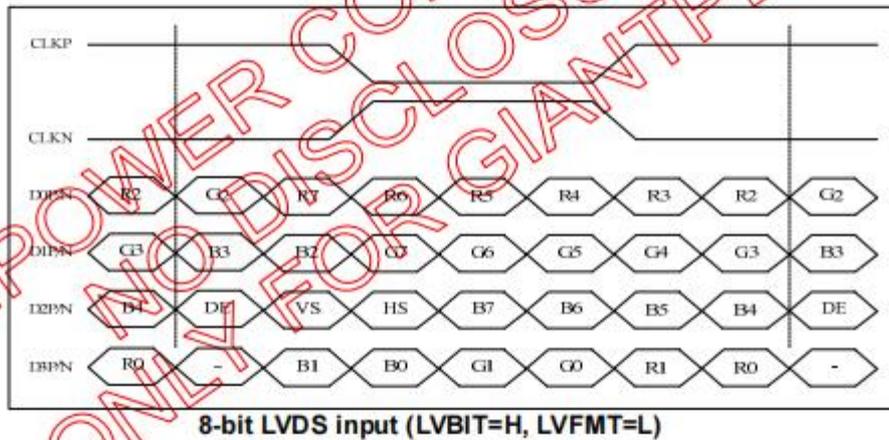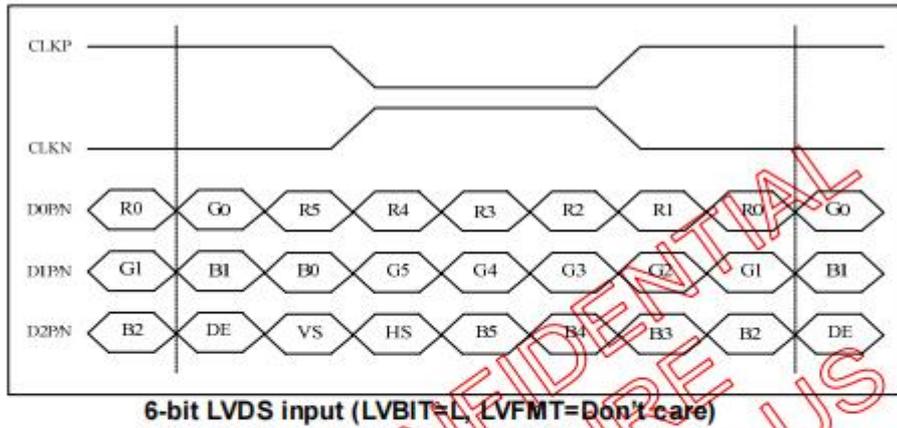
6.6.2.2 Data Input Timing Table

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}		1		
	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}		800		H
VSYNC pulse width	Min.	T_{VPW}		1		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 Characteristics*

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	900	1000	-	Cd/m^2	1
Uniformity	$\triangle$Bp			70	-	-	%	1,2
Viewing Angle	3:00		Cr≥10	70	80	-	Deg	3
	6:00			70	80	-		
	9:00			70	80			
	12:00			70	80	-		
Contrast Ratio	Cr		θ=0° Φ=0°	800	1000	-	-	4
Response Time	T_r			-	10	15	ms	5
	T_f			-	15	20	ms	
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ-0.05	0.295	Typ+0.05	-	1,6
		y			0.296		-	
	R	x			0.584		-	
		y			0.336		-	
	G	x			0.361		-	
		y			0.568		-	
	B	x			0.147		-	
		y			0.092		-	
NTSC Ratio	S			45	50	-	%	

Note：The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 (Φ5mm)

Measuring condition:

- Measuring surroundings: Dark room.

- Measuring temperature: Ta=25 ℃.

- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.
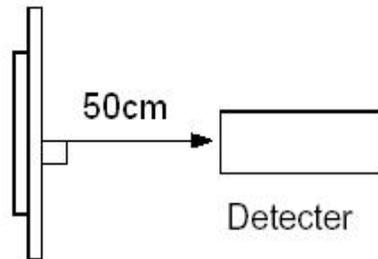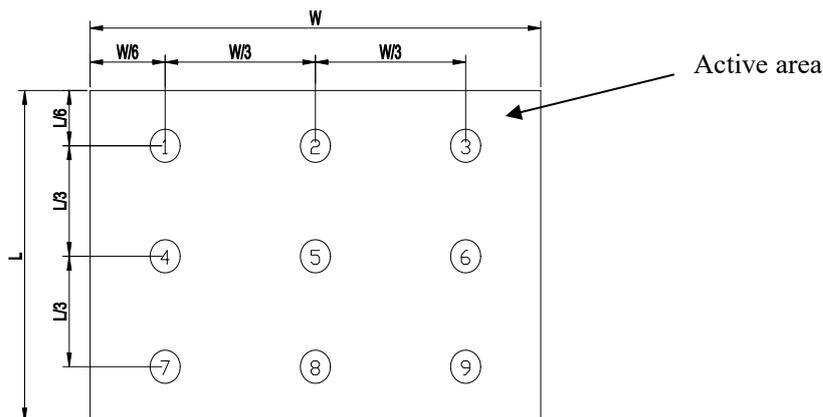

Note 2: The luminance uniformity is calculated by using following formula.
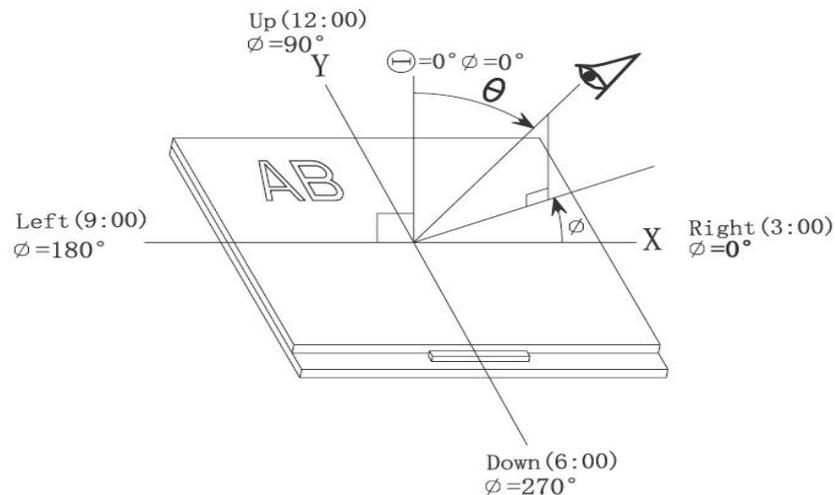
∠*Bp = Bp (Min.) / Bp (Max.)×100 (%)*

Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.

Note 3: The definition of viewing angle:
*Refer to the graph below marked by ϑ and Φ*

Note4: Definition of Contrast Ratio (CR) :

measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note 5: Definition of Response time:

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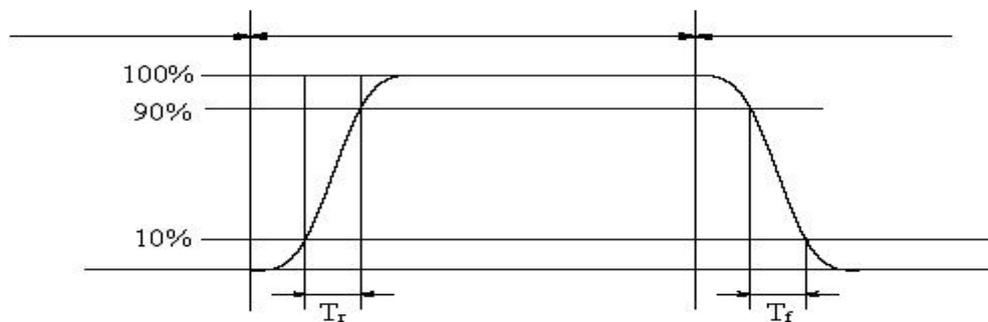
The definition of response time

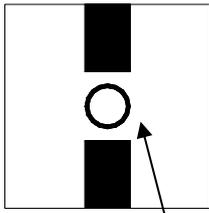*Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.*

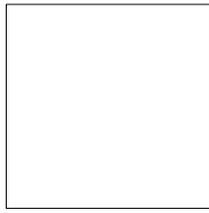1931 CIE Chromaticity Diagram
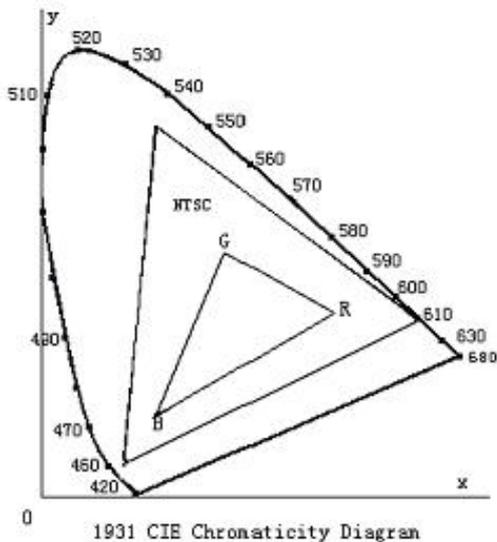
Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.
*Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100*

Pattern A   Pattern B

Measurement point(center)

Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	85℃±2℃ 96H Restore 2H at 25℃ Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 2H at 25℃ Power off	
3	High Temperature Operation	85℃±2℃ 96H Restore 2H at 25℃ Power on	
4	Low Temperature Operation	-30℃±2℃ 96H Restore 4H at 25℃ Power on	
5	High Temperature/Humidity Operation	60℃±2℃ 90%RH 96H Power on	
6	Temperature Cycle	–30℃←——→80℃ 30min 5min 30min after 5 cycle, Restore 2H at 25℃ Power off	

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

9. *Precautions for Use of LCD Modules*

9.1 Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol   — Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer.   Especially, do not use the following:

— Water   — Ketone   — Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

9.2 Storage precautions

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃

Relatively humidity: ≤80%

9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.3 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

END