PRODUCT SPECIFICATIONS

For Customer:_____ ☐ : APPROVAL FOR SPECIFICATION

Customer Model No._____ ☐ : APPROVAL FOR SAMPLE

Module No.: *GZ70203-DIT080XG* *Date : 2024.7.17*

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For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	APPROVER
YZJ		

2. Revision Record

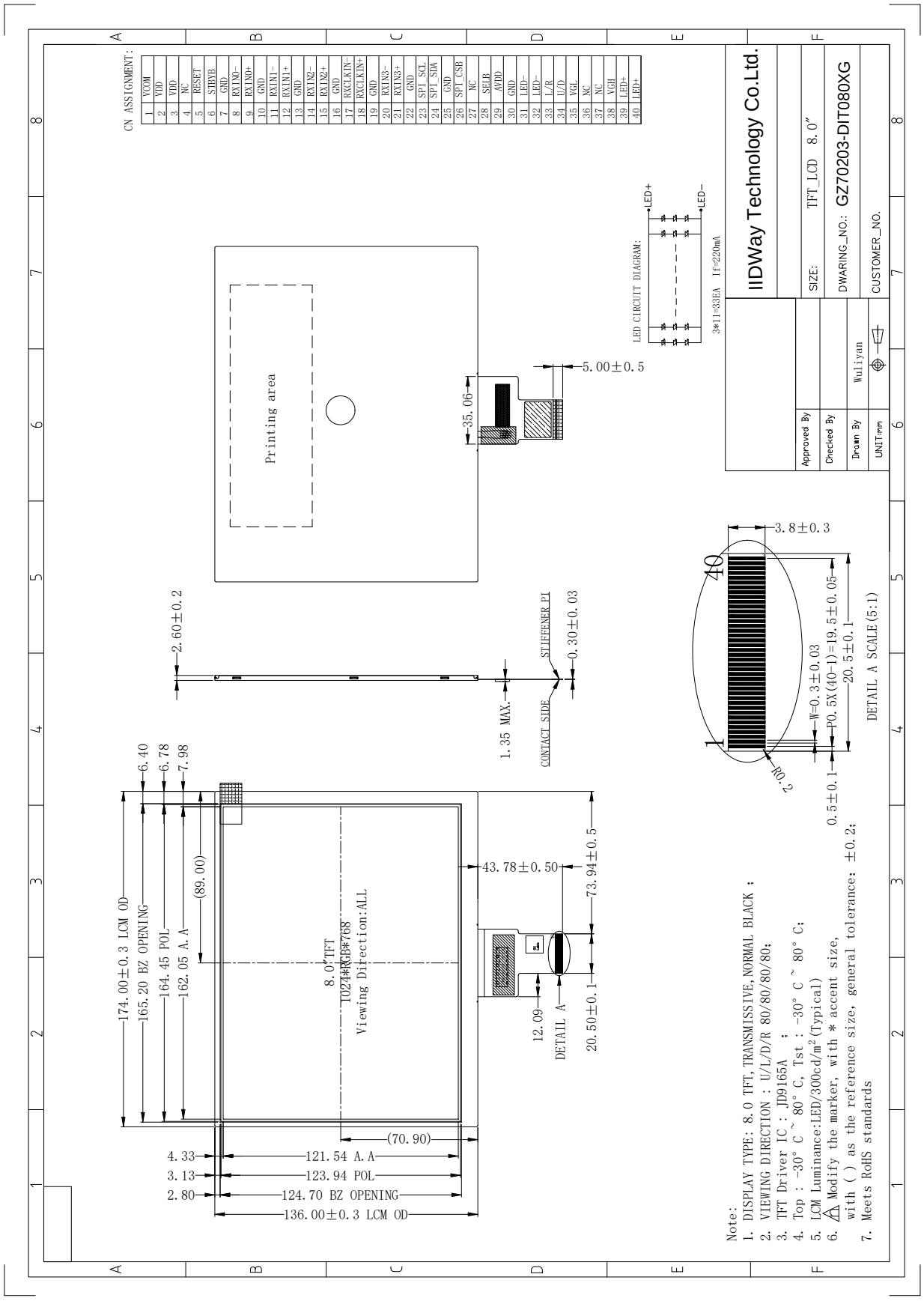
Date	Rev.No.	Page	Revision Items	Prepared
2024.4.24	V0		The first release	YZJ
2024.7.17	V1		Update the SEBL description of the interface definition	Jack

3. General Specifications

GZ70203-DIT080XG is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC,a back light unit. The 8.0′′ display area contains 1024x768 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~+80	℃	
Storage temperature	-30~+80	℃	
Module size	Refer to outline drawing	mm	
Active Area(W×H)	162.05X121.54	mm	
Number of Dots	*1024x768*	dots	
Driver IC	JD9165A	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	Refer to outline drawing	-	
Backlight	3S11P-LEDs (white)	pcs	
Interface	LVDS	-	

4.Outline.Drawing



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}	-0.3	3.96	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℃	80℃	-30℃	+80℃
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℃.

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℃	2.5	3.3	3.6	V	
Current		IVDD	Ta=25℃	-	18.35	-	mA	
Analog supply voltage		AVDD	Ta=25℃	-	10	-	V	
Current		IAVDD	Ta=25℃	-	31.13	-	mA	
TFT Gate ON Voltage		VGH	Ta=25℃	-	20	-	V	
Current		IVGH	Ta=25℃	-	2.27	-	mA	
TFT Gate OFF Voltage		VGL	Ta=25℃	-	-8	-	V	
Current		IVGL	Ta=25℃	-	2.24	-	mA	
TFT Common Electrode Voltage		VCOM	Ta=25℃	-	3.58	-	V	
Current		IVCOM	Ta=25℃	-	5.2	-	uA	
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=220mA	8.1	9	9.9	V	
Uniformity	∆Bp	If=220mA	75	-	-	%	
LED Life Time	-	-	30K	-	-	hr	1

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

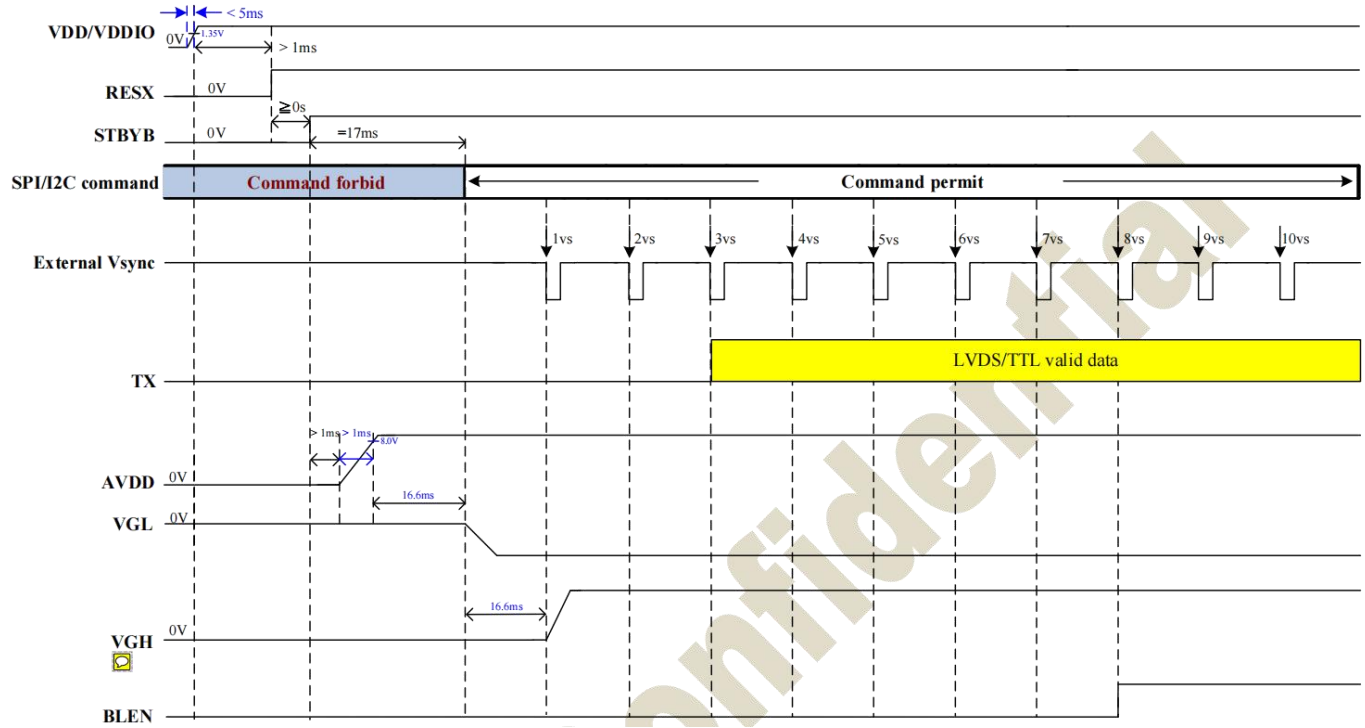
6.3 Interface signals

6.3.1 LCM PIN

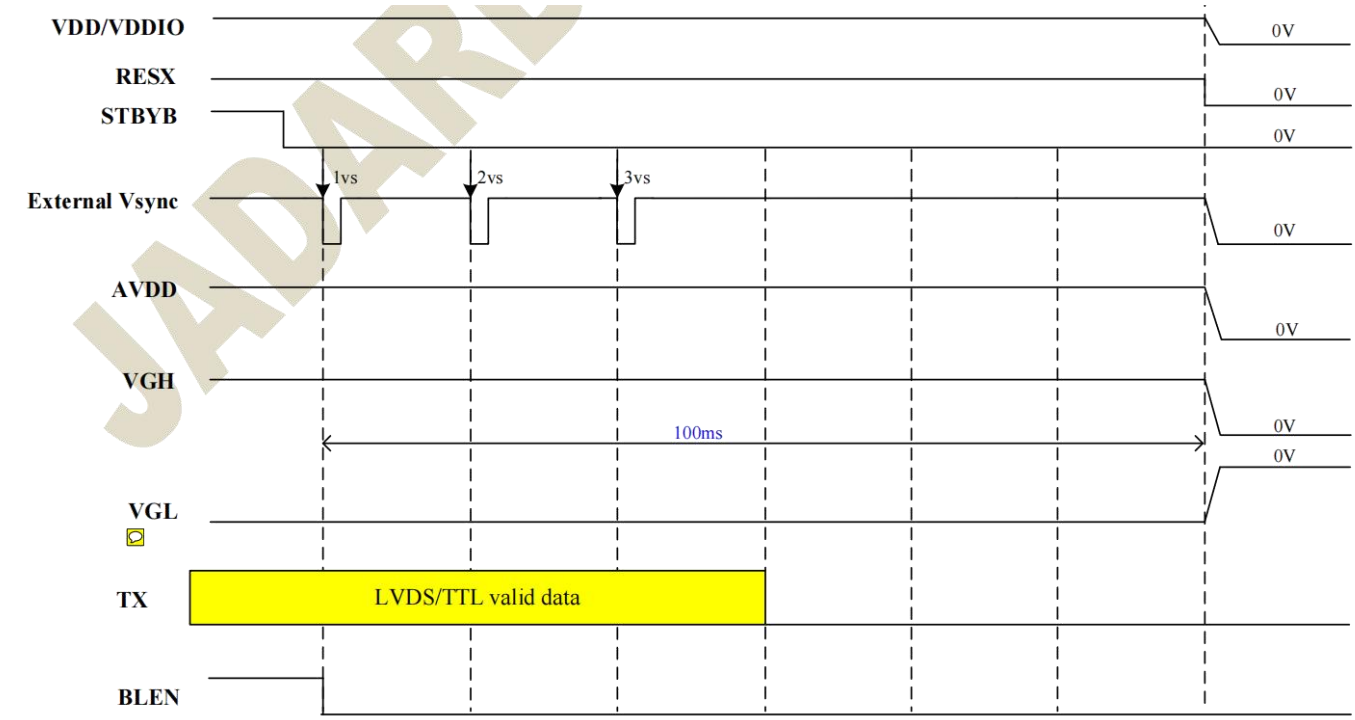
Pin No.	Symbol	I/O	Function
1	VCOM	P	Common voltage for panel
2-3	VDD	P	Power supply
4	NC		No connection
5	Reset	I	Global reset signal input pin
6	STBYB	I	Standby mode control pin STBYB = “Low” : Standby. STBYB = “High” : Normal display.
7	GND	P	Ground
8	RXIN0-	I	Negative LVDS differential data pair0
9	RXIN0+	I	Positive LVDS differential data pair0
10	GND	P	
11	RXIN1-	I	Negative LVDS differential data pair1
12	RXIN1+	I	Positive LVDS differential data pair1
13	GND	P	Ground
14	RXIN2-	I	Negative LVDS differential data pair2
15	RXIN2+	I	Positive LVDS differential data pair2
16	GND	P	Ground
17	RXCLKIN-	I	Negative LVDS differential clock pair
18	RXCLKIN+	I	Positive LVDS differential clock pair
19	GND	P	Ground
20	RXIN3-	I	Negative LVDS differential data pair3
21	RXIN3+	I	Positive LVDS differential data pair3
22	GND	P	Ground
23	SPI_SCL	I	Serial interface clock pin
24	SPI_SDA	I	Serial in/out signal pin
25	GND	P	Ground
26	SPI_CSB	I	Chip select input pin
27	NC		No connection
28	SELB	I	SELB=1 ,LVDS 8 BIT SELB=0, LVDS 6 BIT
29	AVDD	P	Input positive power from system/ external power IC.
30	GND	P	Ground
31-32	LED-	P	LED back light(Cathode)
33	L/R	I	Select left to right scanning direction
34	U/D	I	Select up or down scanning direction
35	VGL	P	Negative power for TFT
36-37	NC		No connection
38	VGH	P	Positive power for TFT
39-40	LED+	P	LED back light(Anode)

6.4 Power Sequence

Power on



Power off



6.5 Timing characteristic

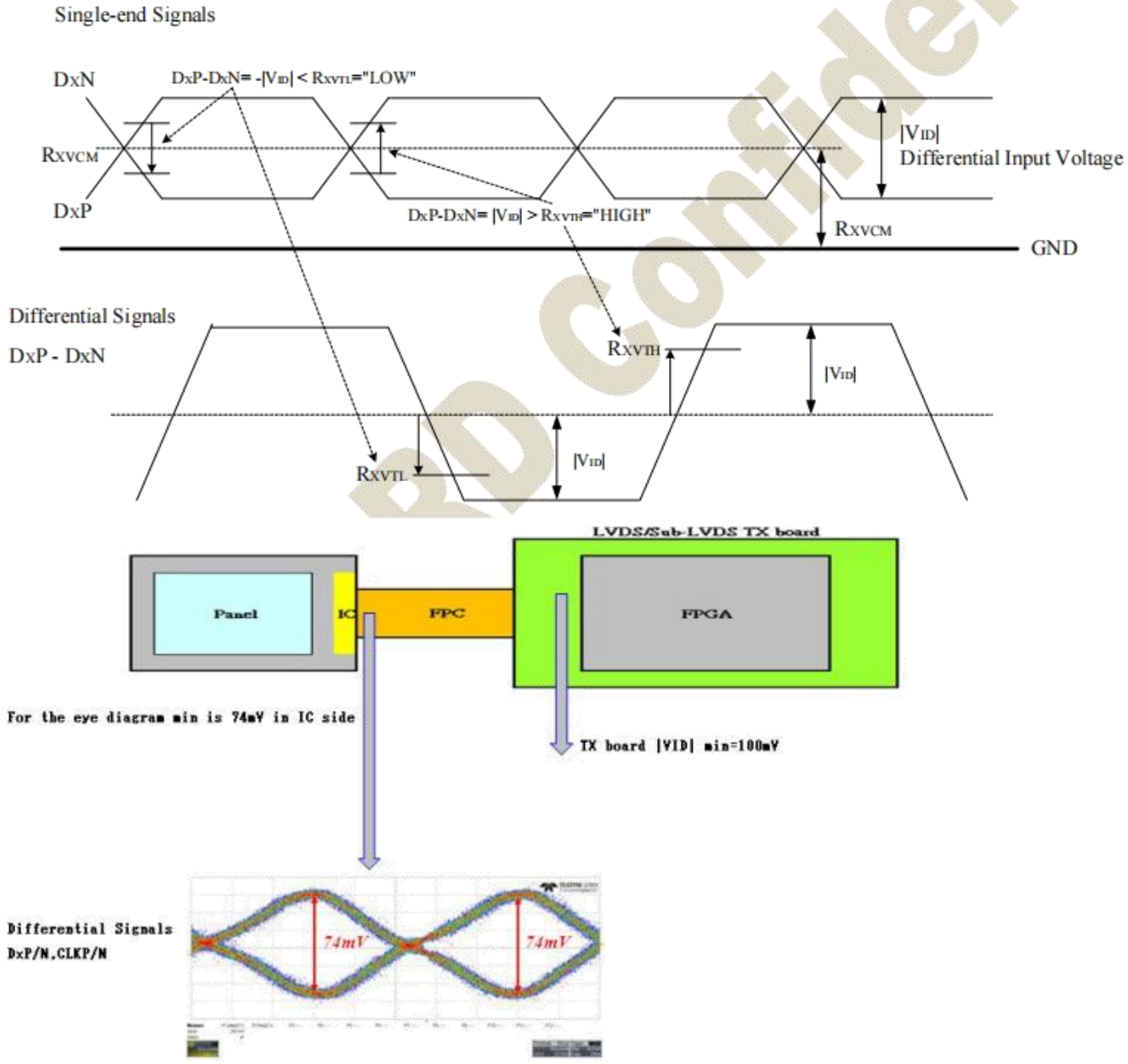
LVDS Input Timing	Symbol	1024RGBx768			1024RGBx600			800RGBx600			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
DCLK Frequency	-	52	65	71	40.8	51.2	67.2	32.6	39.6	62.4	MHZ
Horizontal Total	tht	1114	1344	1400	1114	1344	1400	890	1000	1300	DCLK
Hsync Pulse width	ths	1	24	HBP-1	1	24	HBP-1	1	24	HBP-1	DCLK
Horizontal Back Porch	thb	60	160	160	60	160	160	60	88	250	DCLK
Horizontal Valid Data	thd		1024			1024			800		DCLK
Horizontal Front Porch	thfp	30	160	216	30	160	216	30	112	250	DCLK
Vertical Total	tvt	778	806	845	610	635	800	610	660	800	THT
Vsync Pulse Width	tvs	1	2	VBP-1	1	2	VBP-1	1	2	VBP-1	THT
Vertical Back Porch	tvb	8	23	33	8	23	100	8	39	100	THT
Vertical Valid Data	tvd		768			600			600		THT
Vertical Front Porch	tvfp	2	15	44	2	12	100	2	21	100	THT

LVDS Input Timing	Symbol	640RGBx480			480RGBx272			Unit
		Min	Typ	Max	Min	Typ	Max	
DCLK Frequency	-	32.6	39.6	53.4	24.8	32.6	37.6	MHZ
Horizontal Total	tht	890	1000	1114	830	890	950	DCLK
Hsync Pulse width	ths	1	24	HBP-1	1	24	HBP-1	DCLK
Horizontal Back Porch	thb	140	88	220	180	210	240	DCLK
Horizontal Valid Data	thd		640			480		DCLK
Horizontal Front Porch	thfp	110	272	254	170	200	230	DCLK
Vertical Total	tvt	610	660	800	498	610	660	THT
Vsync Pulse Width	tvs	1	2	VBP-1	1	2	VBP-1	THT
Vertical Back Porch	tvb	28	39	160	126	180	210	THT
Vertical Valid Data	tvd		480			272		THT
Vertical Front Porch	tvfp	102	141	160	100	158	178	THT

6.6 DC electrical characteristic

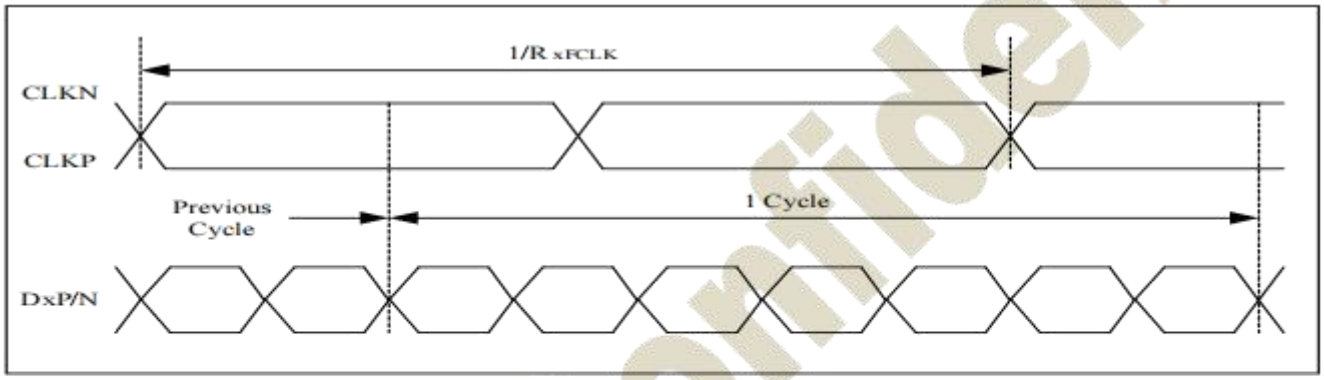
(Test condition: VDD=2.5V~3.3V, VSS=0V)

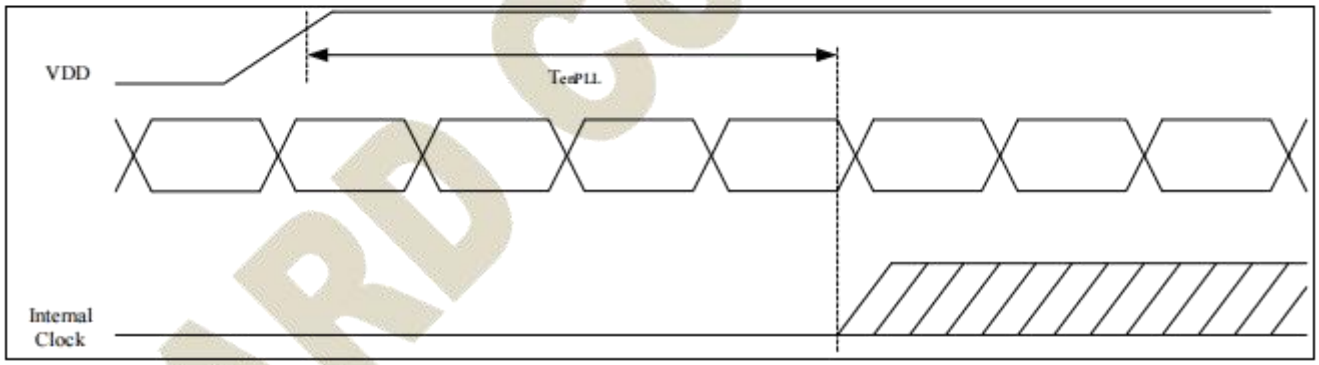
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R_{XVTH}			+37	mV	
Differential input low threshold voltage	R_{XVTL}	-37			mV	
Input voltage range (singled-end)	R_{XVIN}	400	-	1400	mV	1. R_{XVCM+}|V_{ID}|<=1400mV. 2. R_{XVCM-}|V_{ID}|>=400mV.
Differential input common mode voltage	R_{XVCM}	600	1000	1300	mV	
Differential input voltage	|V_{ID}|	100	-	400	mV	
Differential input impedance	Z_{ID}	80	100	120	ohm	
Differential input leakage current	I_{LCLVDS}	-10	-	+10	uA	

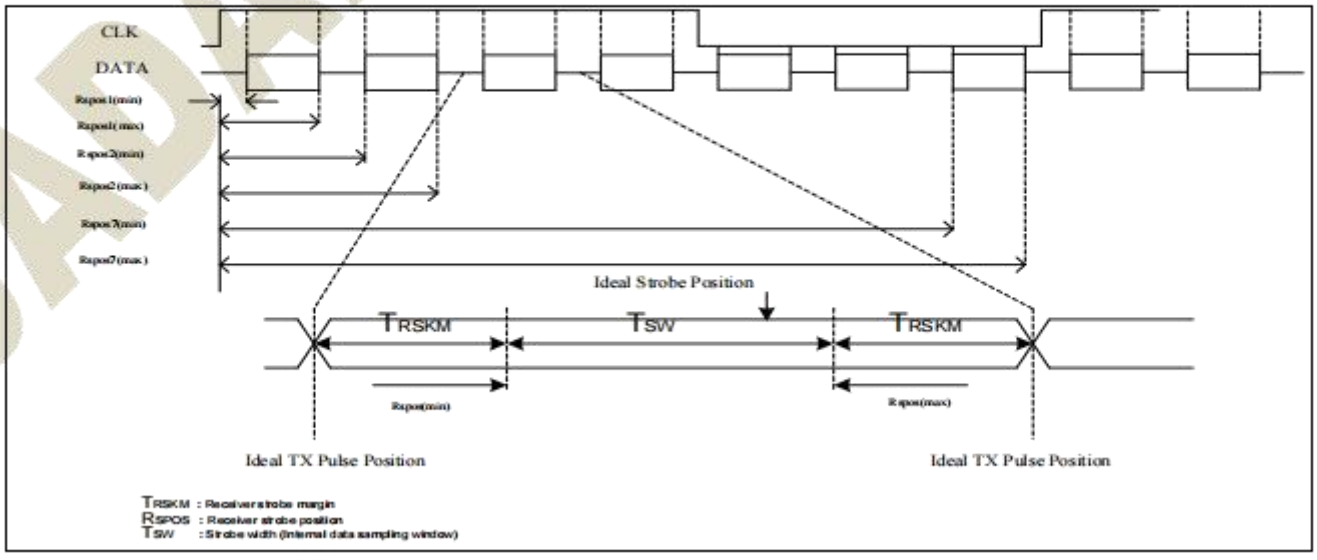


6.7 AC electrical characteristic

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	20	-	71	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	-0.2	-	0.2	UI	|VID| = 200mV RxVCM = 1.2V 1UI=1/(RxFCLKx7)
Clock high time	T_{LVCH}	-	3.5/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3.5/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	







7. *Optical Characteristics*

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	-	300	-	Cd/m^2	1
Uniformity	⊿Bp			75	-	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	80	-	Deg	3
	6:00			-	80	-		
	9:00			-	80	-		
	12:00			-	80	-		
Contrast Ratio	Cr		θ=0° Φ=0°	800	1000	-	-	4
Response Time	$T_{r+}T_f$			-	30	35	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ-0.05	0.2865	Typ+0.05	-	1,6
		y			0.2922		-	
	R	x			0.6198		-	
		y			0.3663		-	
	G	x			0.3495		-	
		y			0.6033		-	
	B	x			0.1461		-	
		y			0.0855		-	
NTSC Ratio	S			55	60	-	%	

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

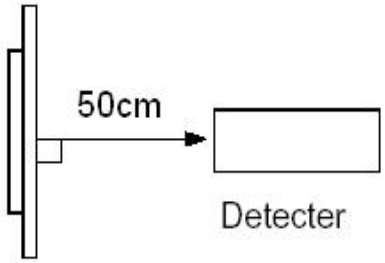
*Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipm*ent BM-7 (Φ5mm)

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.

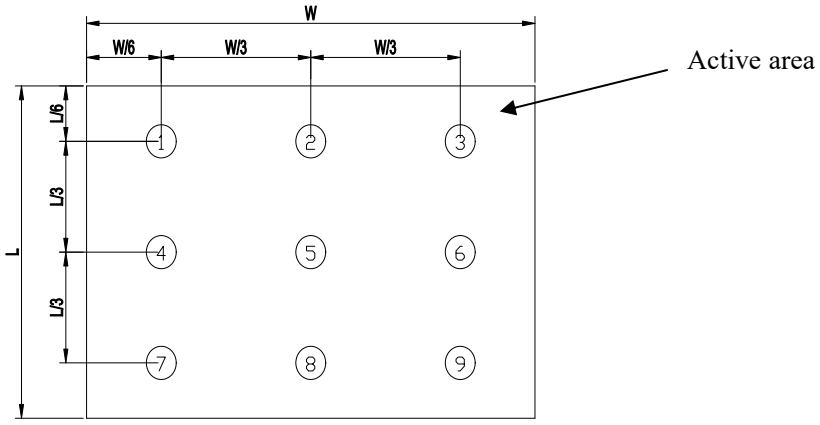


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

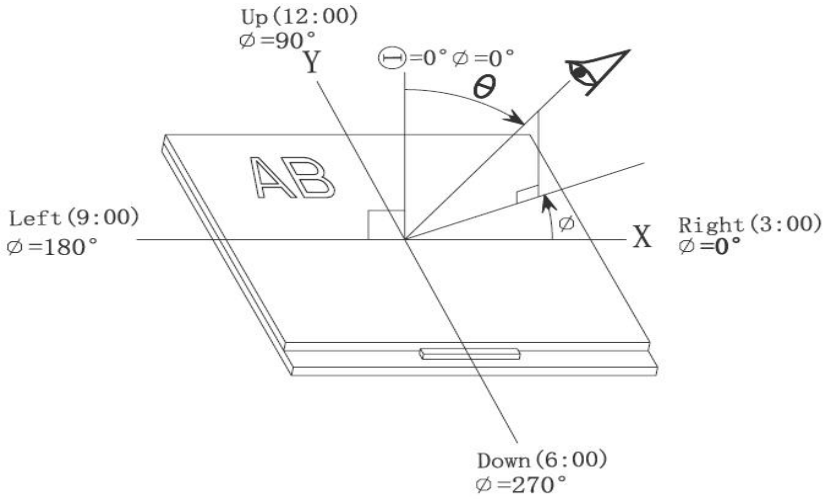
Bp (Max.) = Maximum brightness in 9 measured spots

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

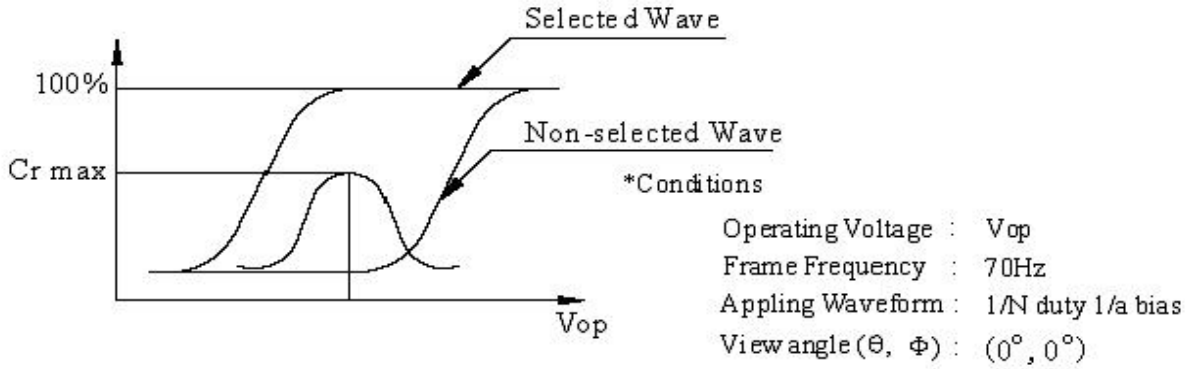


Note 3: The definition of viewing angle:

Refer to the graph below marked by ϑ and Φ



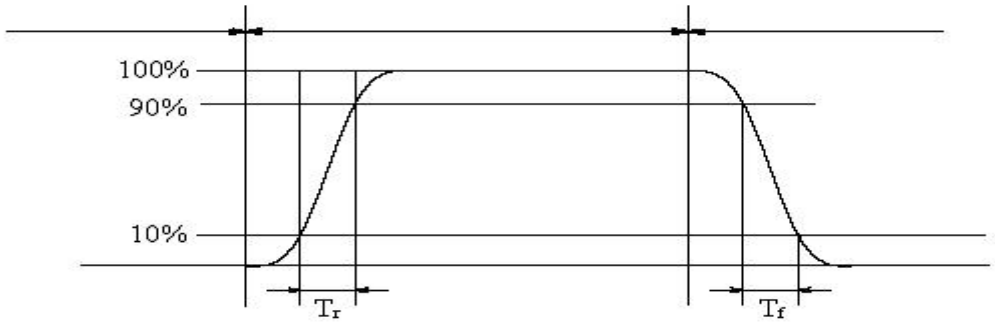
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



$$Contrast\ ratio(Cr) = \frac{Brightness\ of\ selected\ dots}{Brightness\ of\ non-selected\ dots}$$

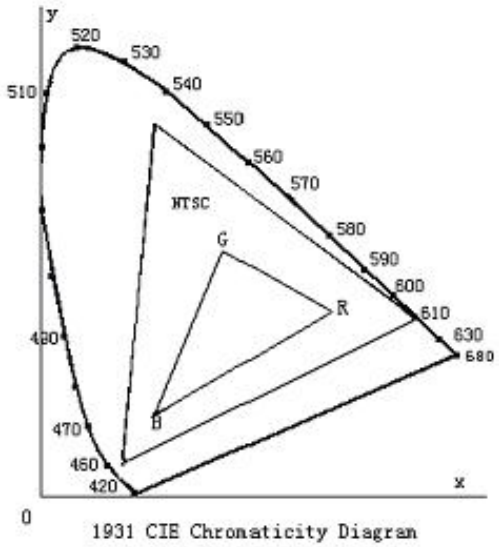
Note 5: Definition of Response time. (Test LCD using DMS501):

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.

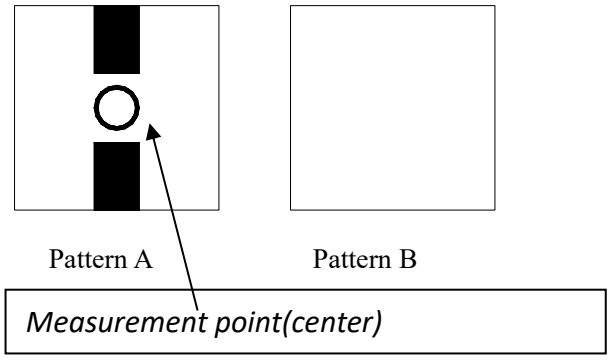


Color gamut:

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

Note 7: Definition of cross talk.

*Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100*



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±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	80℃±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