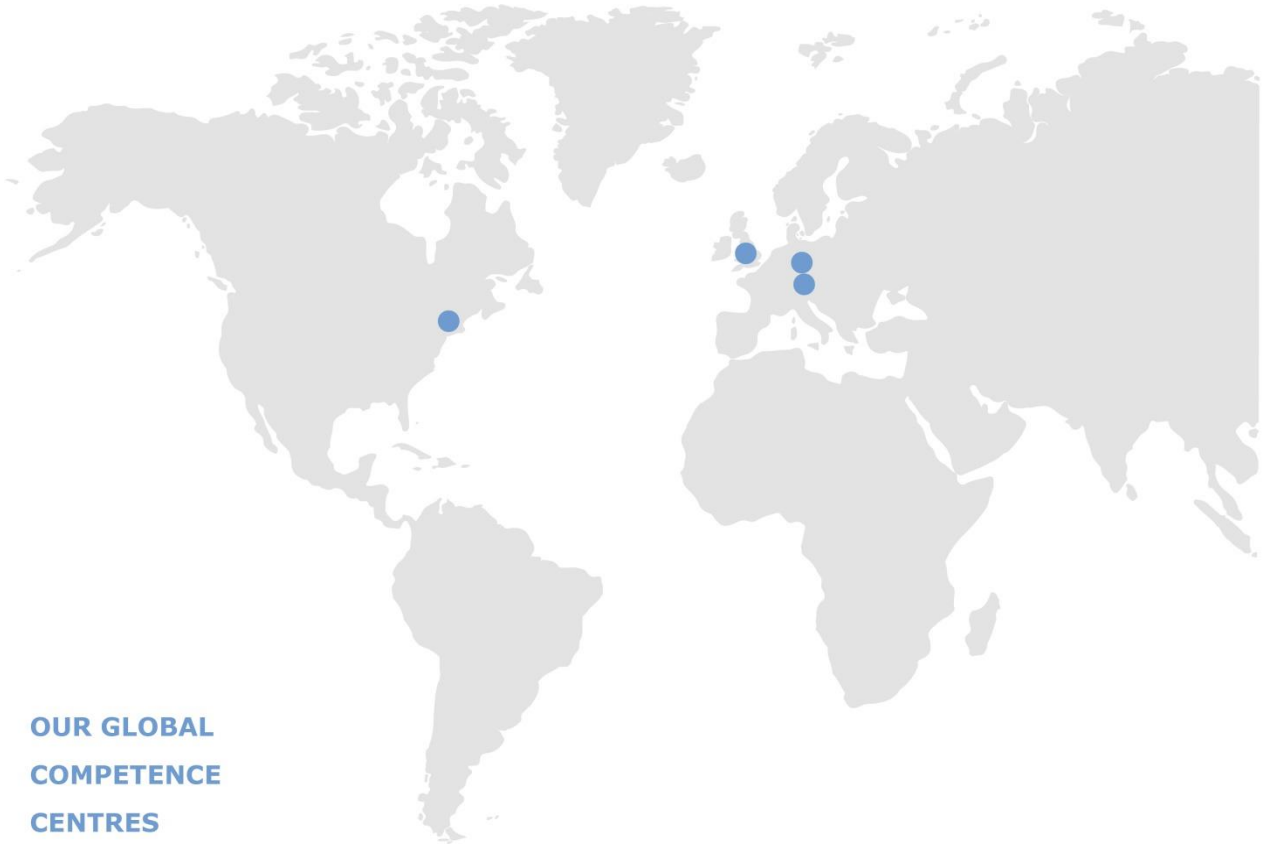
FORTEC
ELEKTRONIK AG



OUR GLOBAL COMPETENCE CENTRES

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Datasheet

Disea

ZW-T070TIS-03

DE-05-026

PRODUCT SPECIFICATIONS

For Customer:_____

☐ : APPROVAL FOR SPECIFICATION

Customer Model No. _____

☐ : APPROVAL FOR SAMPLE

Module No.: *ZW-T070TIS-03*

Date : 2022-10-31

Table of Contents

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT
XZX			

2. Revision Record

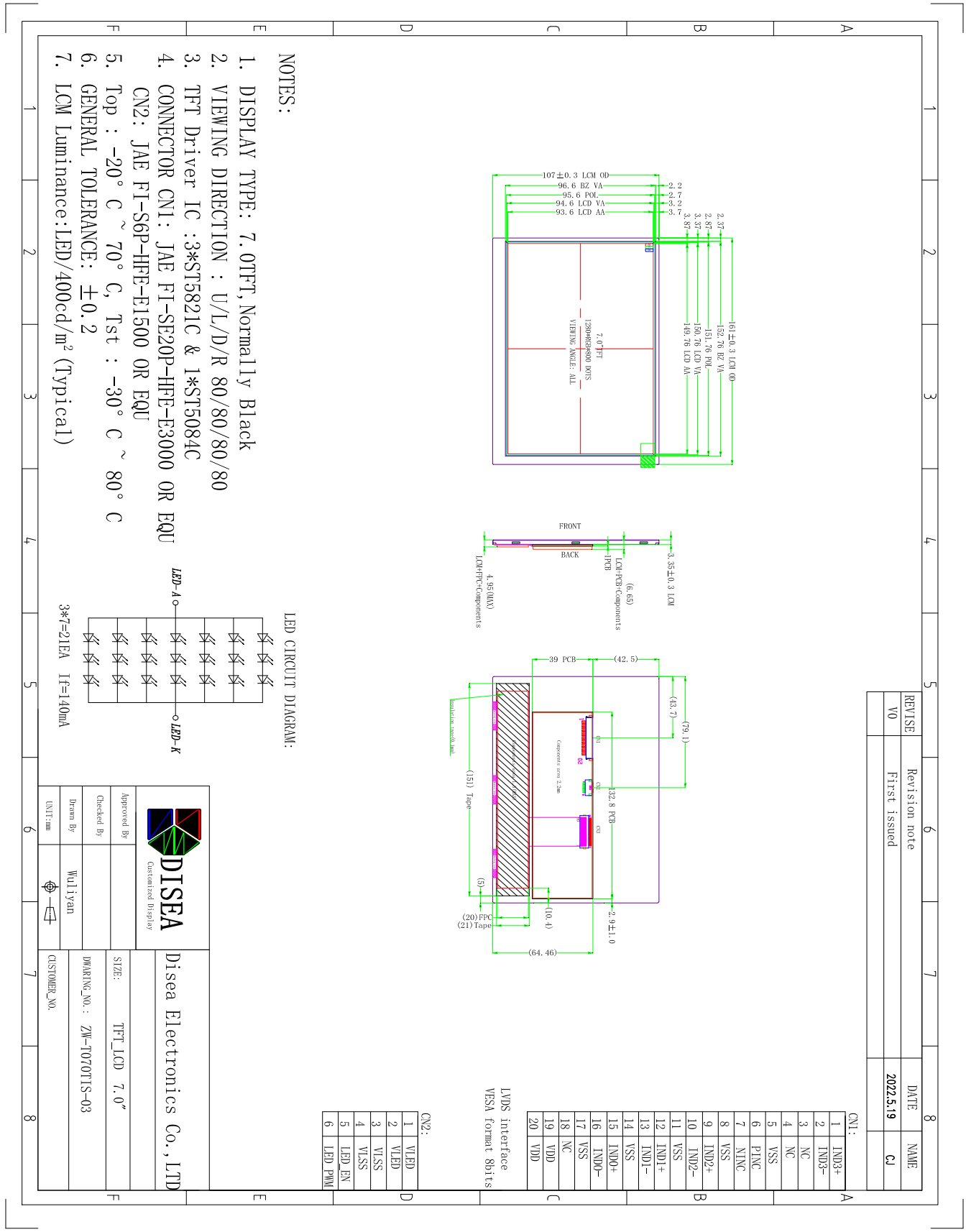
Date	Rev.No.	Page	Revision Items	Prepared
2022-05-31	**V0**		**The first release**	**XZX**
2022-10-28	**V1**		**item 6.1 consumption added**	**XZX**

3. General Specifications

ZW-T070TIS-03 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC a back light unit. The 7.0'' display area contains 1280 x (RGB) x 800 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	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	161x107x3.35	mm	
Active Area(W×H)	149.76X 93.6	mm	
Number of Dots	1280×800	dots	
Controller	ST5821C,ST5084C	-	
Power Supply Voltage	3.3	V	
Backlight	3*7-LEDs (white)	pcs	
Weight	---	g	
Interface	LVDS Interface	-	

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	5.0	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_{CC} >V_{SS} must be maintained.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

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℃	3.0	3.3	3.6	V	
Input voltage	'H'	V_{IH}	VDD=3.3V	0.7VDD	-	VDD	V	
	'L'	V_{IL}	VDD=3.3V	0	-	0.3VDD	V	
Current Consumption		IDD	Normal mode	42.4	53	63.6	mA	

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

Item		Symbol	Min	Typ	Max	Unit	Note
Supply voltage		VLED	5.5	12.0	12.5	V	
Supply Current		IL	-	200	-	mA	(VL=12V) PWM=100%
Power Consumption		PL	-	2.4	-	W	(VL=12V) PWM=100%
PWM Control Frequency		F_{PDIM}	100	-	30K	Hz	
Backlight ON-OFF	High	BLEN	1.6	-	VLED	V	
	Low		0	-	0.8	V	
PWM Control Level	High	V_{PDIM}	1.6	-	VLED	V	
	Low		0	-	0.8	V	
Uniformity		∆Bp	75	80	-	%	
Life Time		time	-	30K	-	hours	1

Note 1: 1.The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 ℃ and ILED = 20mADC(LED forward current) until the brightness becomes ≦ 50% of its original value.

2. Please note that LED life will be shorter than the average life described in the specification if operate in higher ambient temperature.

Pin No.	Symbol	I/O	Function
1	IND3+	I	Positive LVDS differential data input.
2	IND3-	I	Negative LVDS differential data input.
3-4	NC	-	No connection.
5	VSS	P	Ground.
6	PINC	I	Positive LVDS differential clock input.
7	NINC	I	Negative LVDS differential clock input.
8	VSS	P	Ground.
9	IND2+	I	Positive LVDS differential data input.
10	IND2-	I	Negative LVDS differential data input.
11	VSS	P	Ground.
12	IND1+	I	Positive LVDS differential data input.
13	IND1-	I	Negative LVDS differential data input.
14	VSS	P	Ground.
15	IND0+	I	Positive LVDS differential data input.
16	IND0-	I	Negative LVDS differential data input.
17	VSS	P	Ground.
18	NC	-	No connection.
19-20	VDD	P	Power supply.

6.3 CN1 Interface signals

6.4 CN2 Backlight interface signals

Pin No.	Symbol	I/O	Function
1-2	VLED	P	Anode for LED backlighting.
3-4	VLSS	P	Cathode for LED backlighting.
5	LED_EN	I	LED backlighting enable signal.
6	LED_PWM	I	PWM signal.

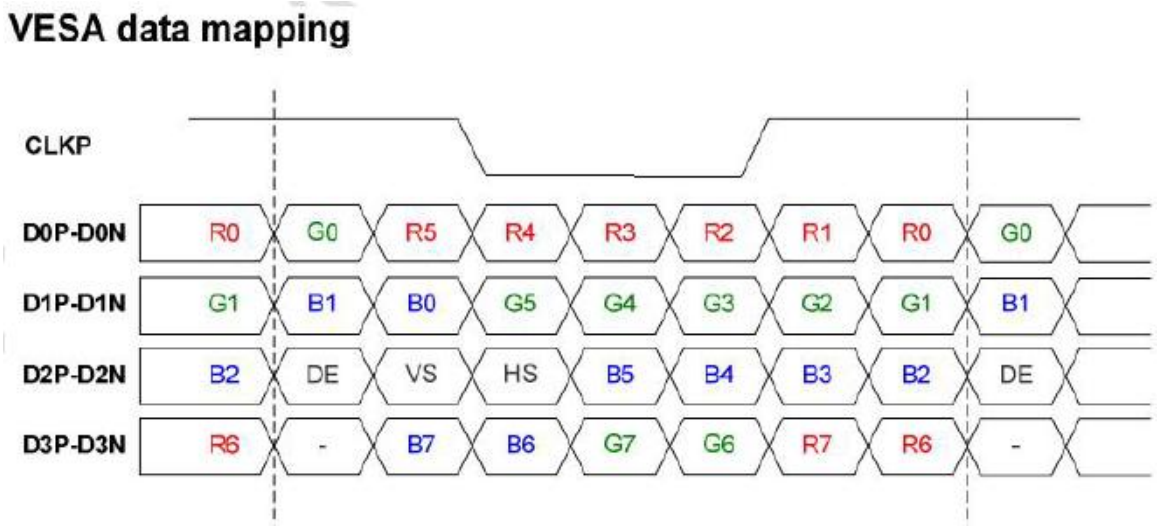
6.5 Timing

1280x800 (RES[3:0] = 0010)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	t_{CLK}	62.6	68.2	78.1	Mhz	
Horizontal blanking time	t_{HBT}	20	69	164	t_{CLK}	$t_{HBP} + t_{HFP}$
Horizontal back porch	t_{HBP}	5	5	164- t_{HFP}	t_{CLK}	
Horizontal display area	t_{HD}	1280	1280	1280	t_{CLK}	
Horizontal front porch	t_{HFP}	15	64	159	t_{CLK}	
Horizontal period	t_H	1300	1349	1444	t_{CLK}	
Horizontal pulse width	t_{HPW}	1	1	256	t_{CLK}	
Vertical blanking time	t_{VBT}	5	42	101	t_H	$t_{VBP} + t_{VFP}$
Vertical back porch	t_{VBP}	2	2	101- t_{VFP}	t_H	
Vertical display area	t_{VD}	800	800	800	t_H	
Vertical front porch	t_{VFP}	3	40	99	t_H	
Vertical period	t_V	803	842	901	t_H	
Vertical pulse width	t_{VPW}	1	1	128	t_H	

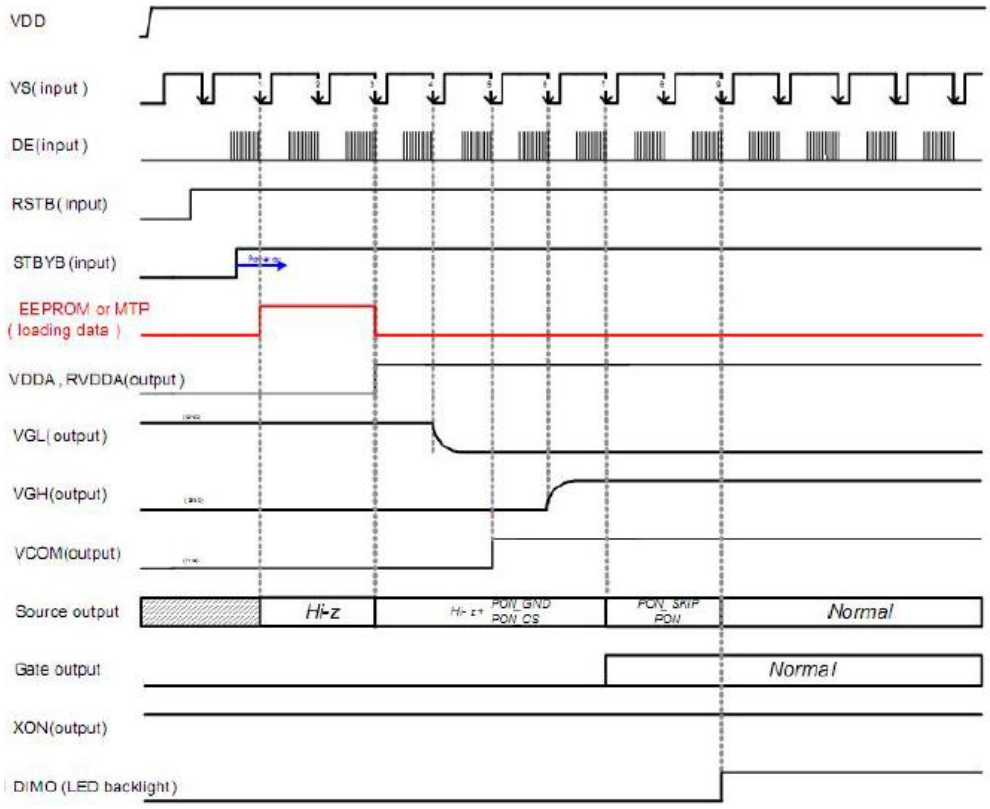
Input timing

6.6 Data Input Format

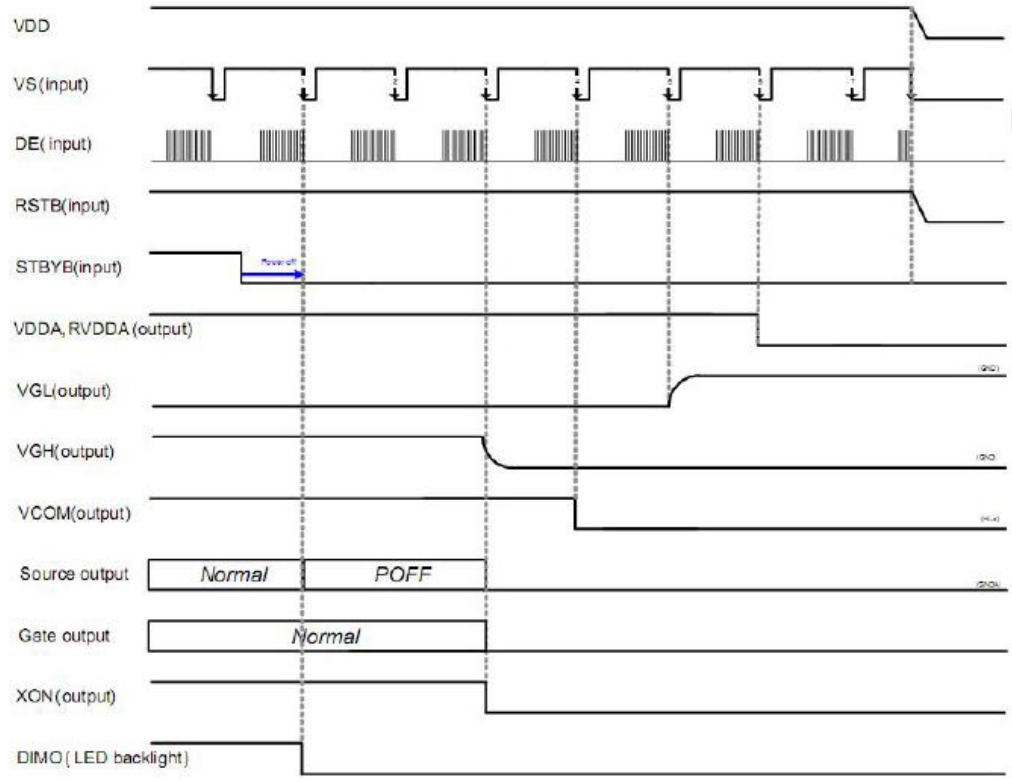


VESA data input timing

6.7 Power On/Off Timing



Power Off:



7. Optical *Characteristics*

Item	Symbol		**Condition**	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	-	400	-	Cd/m²	1
Uniformity	⊿Bp			75	-	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	85	-	***Deg***	***1***
	6:00			-	85	-		
	9:00			-	85	-		
	12:00			-	85	-		
Contrast Ratio	Cr		θ=0° Φ=0°	600	800		-	4
Response Time	T_r+ T_f			-	35	40	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ. -0.05	0.306	Typ. +0.05	-	1,6
		y			0.329		-	
	R	x			0.570		-	
		y			0.330		-	
	G	x			0.350		-	
		y			0.592		-	
	B	x			0.155		-	
		y			0.101		-	
NTSC Ratio	S			45	50	-	%	

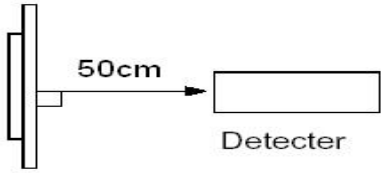
Note：The parameter is slightly changed by temperature, driving voltage and materiel

*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 equipm*ent PR-705 (Φ8mm)

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.

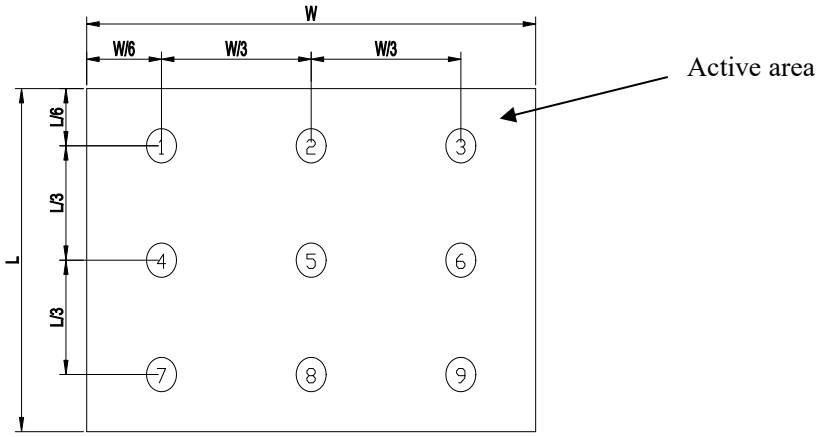


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

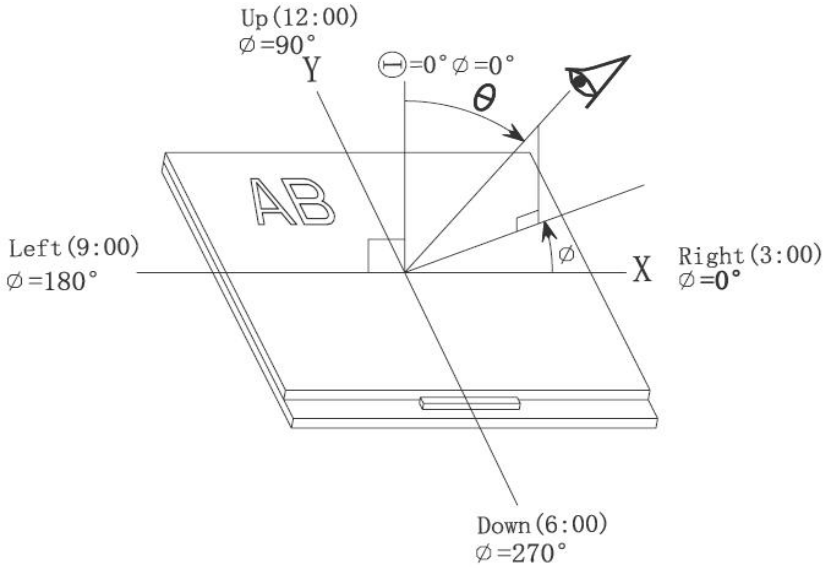
Bp (Max.) = Maximum brightness in 9 measured spots

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

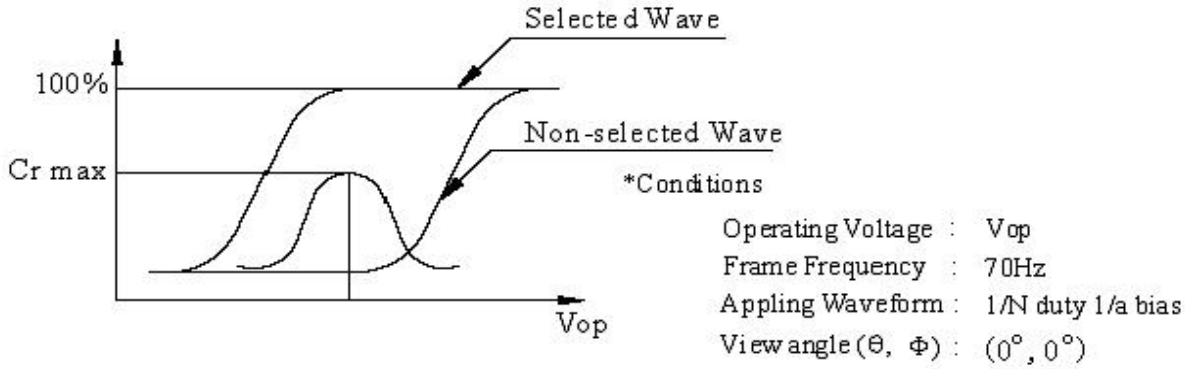


Note 3: The definition of viewing angle:

Refer to the graph below marked by ϑ and Φ



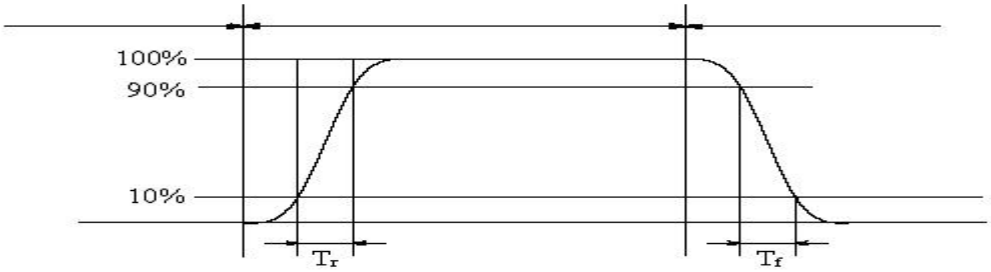
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



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

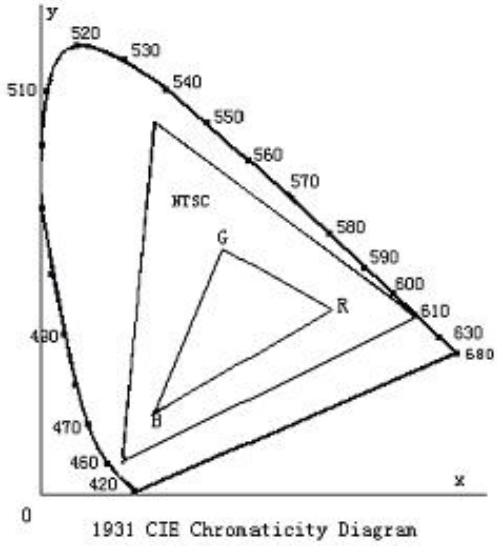
Note 5: Definition of Response time. (Test LCD using DMS501):

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.

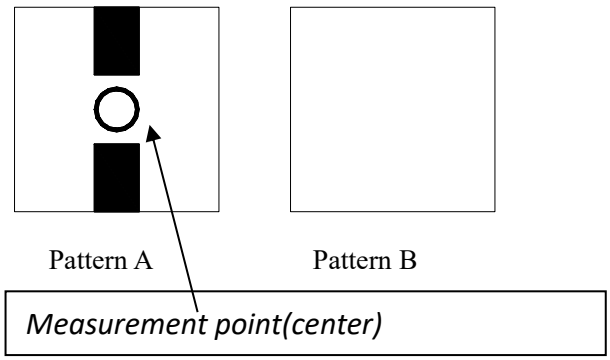


Color gamut:

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

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℃ 240H 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℃ 240H Restore 2H at 25℃ Power off	
3	High Temperature Operation	70℃±2℃ 240H Restore 2H at 25℃ Power on	
4	Low Temperature Operation	-20℃±2℃ 240H Restore 4H at 25℃ Power on	
5	High Temperature/Humidity Operation	60℃±2℃ 90%RH 240H Power on	
6	Temperature Cycle	--30℃←----------→80℃ 30min 5min 30min after 5 cycle, Restore 2H at 25℃ Power off	
7	Vibration Test	10Hz~150Hz, 100m/s2, 120min	Not allowed cosmetic and electrical defects.
8	Shock Test	Half- sine wave,300m/s2,11ms	

Notes:

1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

1).Air bubble in the LCD;
2).Seal leak
3).Non-display
4).missing segments
5).Glass crack
6).CR reduction >40%
7).IDD increase >100%
8).Brightness reduction >50%
9).Color coordinate tolerance >0.05

3. Each test item applies for a test sample only once, The test sample can not be used again in any other test item.

4.For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.
5.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
6 In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module
7 High Temperature Operation、Low Temperature Operation、High Temperature Storage、Low Temperature Storage、High Temperature & Humidity Operation、High Temperature & Humidity Storage will be increased the test time to 1000hours in the same conditions to test out the ability of module, and we can not guarantee that the module will not fail during 1000hours.These items test only once

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

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