

IIDWay Technology Co. Ltd

PRODUCT SPECIFICATIONS

For Customer: _____

: APPROVAL FOR SPECIFICATION

Customer Model No. _____

: APPROVAL FOR SAMPLE

Module No.: GZ70103-DTT050WQ

Date : 2024.4.20

Table of Contents

No.	Item	Page
1	Cover Sheet(Table of Contents)	P1
2	Revision Record	P2
3	General Specifications	P3
4	Outline Drawing	P4
5	Absolute Maximum Ratings	P5
6	Electrical Specifications	P6-P9
7	Optical Characteristics	P10-P13
8	Reliability Test Items and Criteria	P14
9	Precautions for Use of LCD Modules	P15-P16

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	APPROVER
YZJ		

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3. General Specifications

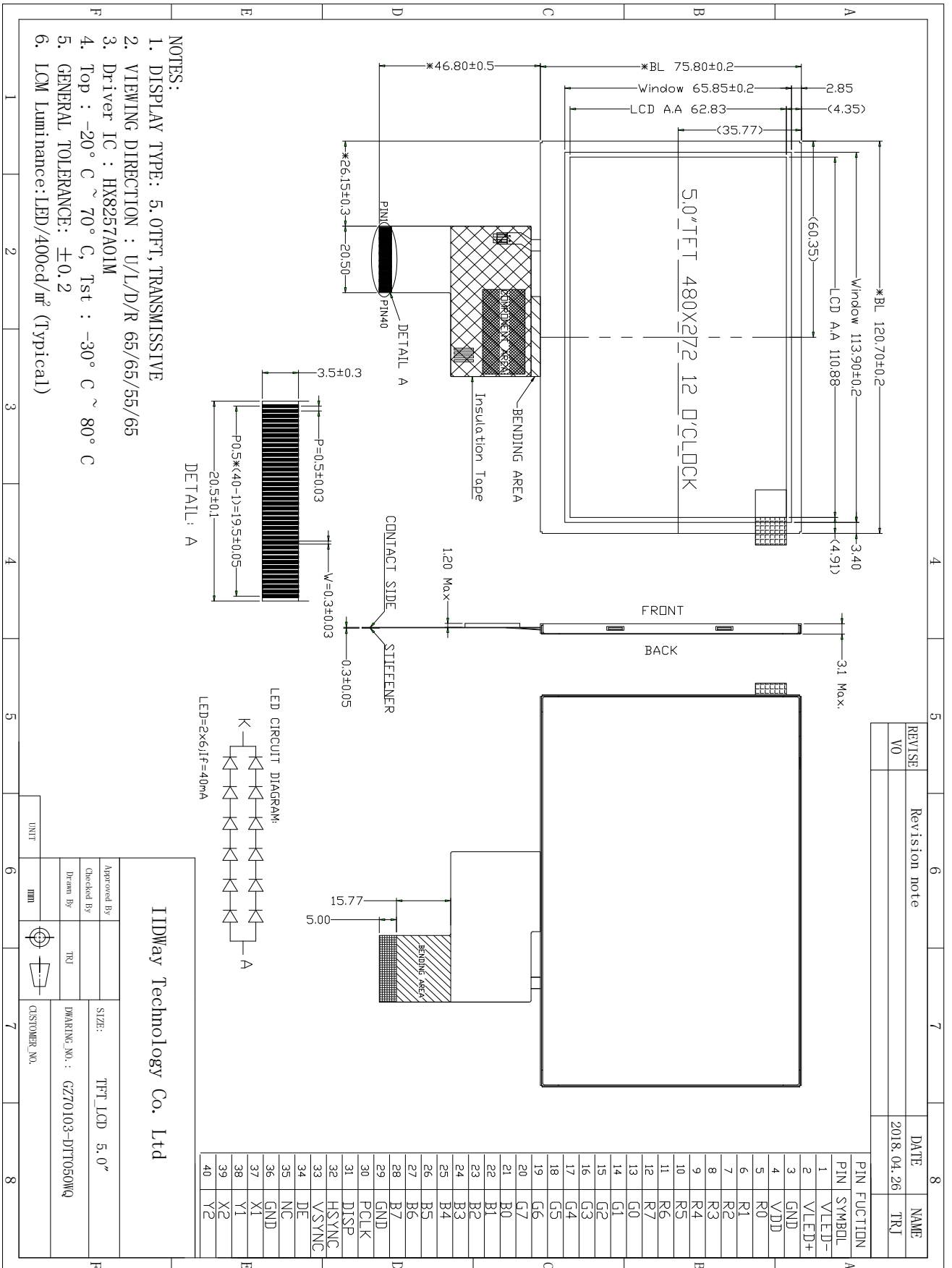
GZ70103-DTT050WQ is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light unit. The 5.0" display area contains 480x 272 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M	1	
Viewing Direction	12	O'Clock	
Operating temperature	-20~+70	°C	
Storage temperature	-30~+80	°C	
Module size	Refer to outline drawing	mm	
Active Area(W×H)	110.88X62.83	mm	
Number of Dots	480x 272	dots	
Driver IC	HX8257	-	
Power Supply Voltage	3.3	V	
Backlight	6S2P-LEDs (white)	pcs	
Interface	RGB888	-	

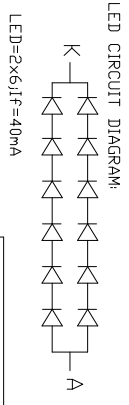
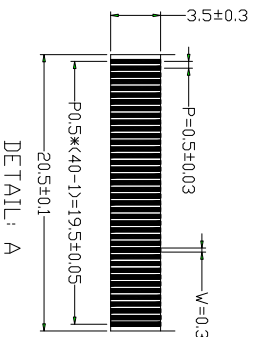
Note1: Color tune is slightly changed by temperature and driving voltage.

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4.Outline.Drawing



- NOTES:
1. DISPLAY TYPE: 5.0TFT, TRANSMISSIVE
 2. VIEWING DIRECTION : U/L/D/R 65/65/55/65
 3. Driver IC : HX8257A01M
 4. Top : -20° C ~ 70° C, Tst : -30° C ~ 80° C
 5. GENERAL TOLERANCE: ±0.2
 6. LCM Luminance: LED/400cd/m² (Typical)



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Approved By	SIZE: TFT_LCD 5.0"
Checked By	
Drawn By	TRJ
DRAWING NO.: GZ70103-DT7050M0Q	
CUSTOMER NO.	

REVISE	Revision note	DATE	NAME
V0		2018.04.26	TRJ

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5. Absolute Maximum Ratings($T_a=25^\circ\text{C}$)

5.1 Electrical Absolute Maximum Ratings.($V_{SS}=0\text{V}$, $T_a=25^\circ\text{C}$)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	-0.3	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°C	80°C	-20°C	70°C
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. $T_a \leq 40^\circ\text{C}$: 85%RH MAX.

$T_a \geq 40^\circ\text{C}$: Absolute humidity must be lower than the humidity of 85%RH at 40°C .

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6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics($V_{SS}=0V, T_a=25^\circ C$)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VDD	$T_a=25^\circ C$	3.0	3.3	3.6	V	
Current Consumption	I_{VDD}	Normal mode	-	18	30	mA	
		Sleep mode	-	0.05	0.1	mA	
Input voltage	'H'	V_{IH}	$V_{DD}=3.3V$	$0.8V_{DD}$	-	V_{DD}	V
	'L'	V_{IL}	$V_{DD}=3.3V$	0	-	$0.2V_{DD}$	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($V_{SS}=0V, T_a=25^\circ C$)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage VLED	V_f	$I_f=20X2mA$	16.2	18	19.8	V	
Uniformity	ΔB_p	$I_f=20X2mA$	80	-	-	%	
LED Life Time	-	-	30K	-	-	hr	1

Note 1: Brightness to be decreased to 50% of the initial value at ambient temperature $T_A=25^\circ C$

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6.3 Interface signals

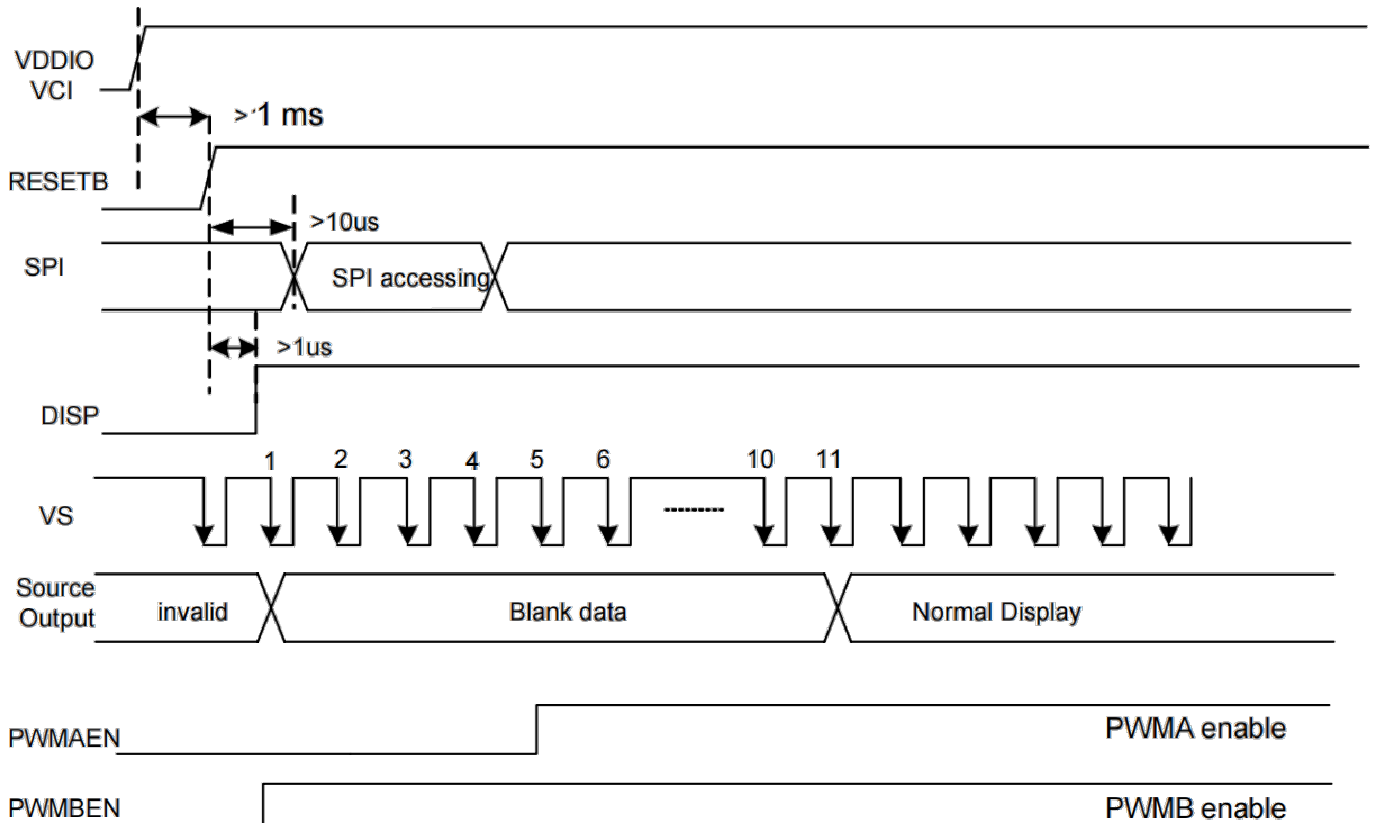
6.3.1 LCM PIN

Pin No.	Symbol	I/O	Function
1	VLED-	P	LED back light(Cathode)
2	VLED+	P	LED back light(Anode)
3	GND	P	Ground.
4	VDD	P	Power supply
5-12	R0~R7	I	Red data bus
13-20	G0~G7	I	Green data bus
21-28	B0~B7	I	Blue data bus
29	GND	P	Ground.
30	PCLK	I	Data clock
31	DISP	I	Nomal diplay and Standby mode select pin
32	HSYNC	I	Line sync signal
33	VSYNC	I	Frame sync signal
34	DE	I	Data enable pin
35	NC		No connection.
36	GND	P	Ground.
37	XR	O	Touch Panel Control pin
38	YD	O	
39	XL	O	
40	YU	O	

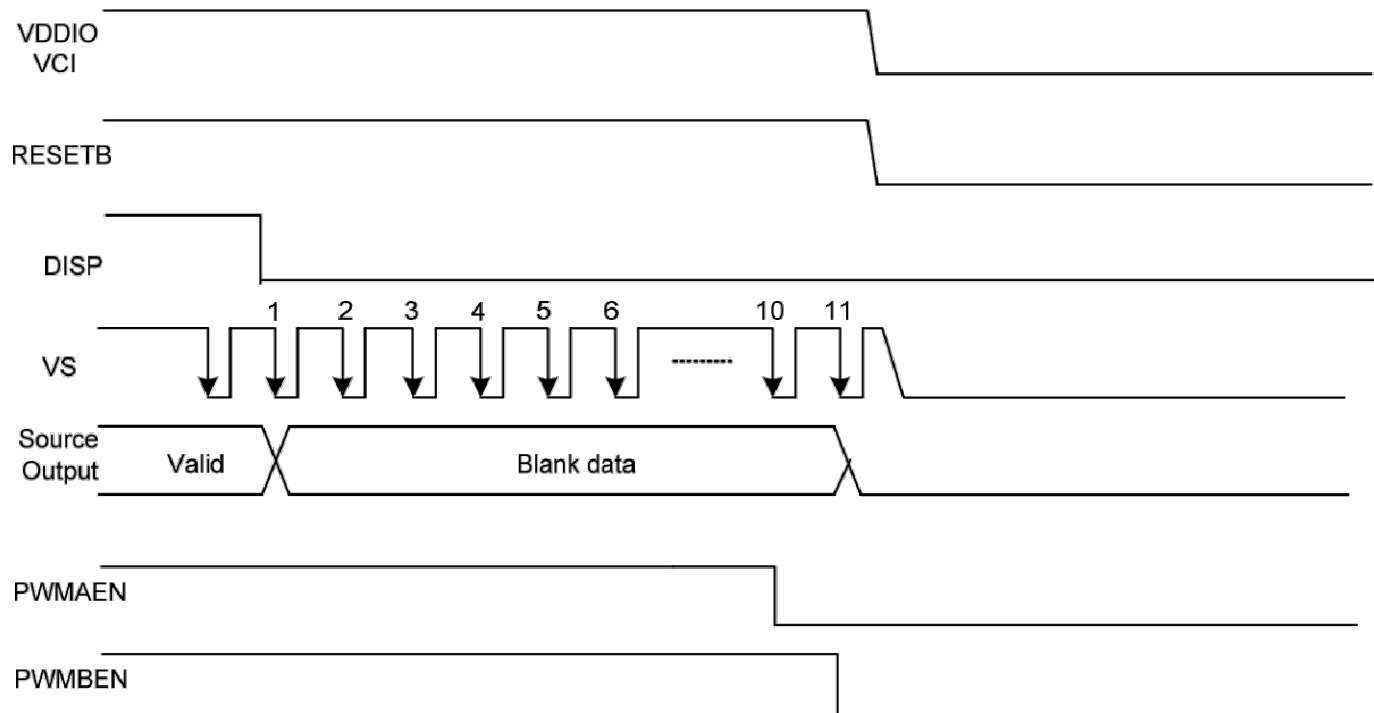
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6.4 Power Sequence

Power On Sequence



Power Off Sequence



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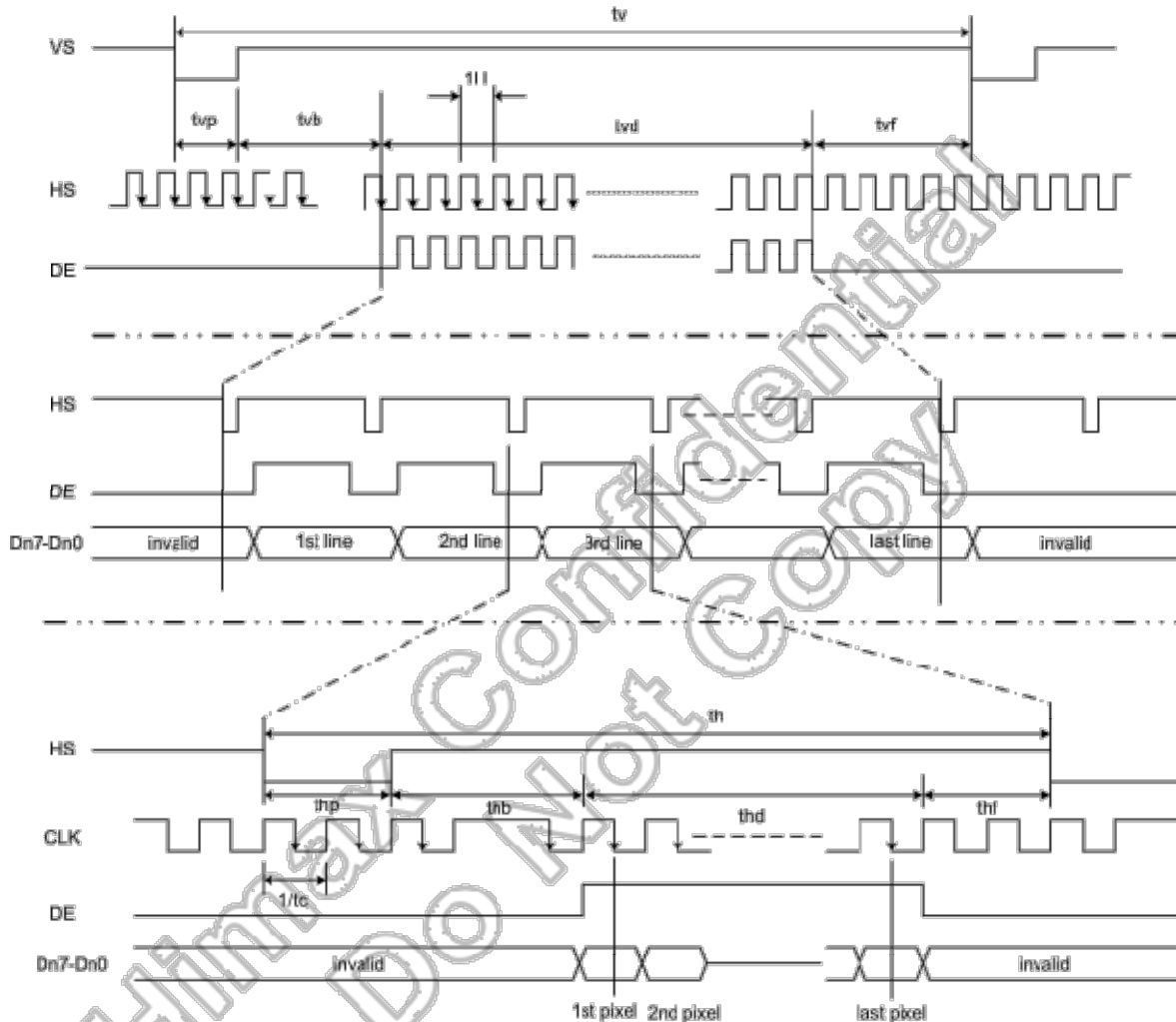
6.5 Parallel RGB input timing requirement

(480RGBx272, T_A=25°C, VDDIO=1.8V to 3.6V, DVSS= 0V)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	f _{CLK} ⁽¹⁾	-	9	15	MHz
Hsync cycle	1/th	-	17.14	-	KHz
Vsync cycle	1/tv	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp ⁽²⁾	2	41	41	CLK
Horizontal back porch	thb ⁽²⁾	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	399	H ⁽¹⁾
Vertical display period	tvd	272	272	272	H ⁽¹⁾
Vertical front porch	tvf	1	2	227	H ⁽¹⁾
Vertical pulse width	tv _p ⁽²⁾	1	10	11	H ⁽¹⁾
Vertical back porch	tv _b ⁽²⁾	1	2	11	H ⁽¹⁾

Note: (1) Unit: CLK=1/f_{CLK}, H= th,

(2) It is necessary to keep tv_p+tv_b=12 and th_p+th_b=43 in sync mode. DE mode is unnecessary to keep it.



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7. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Brightness	Bp	$\theta=0^\circ$	-	400	-	Cd/m ²	1	
Uniformity	ΔBp	$\Phi=0^\circ$	80	-	-	%	1,2	
Viewing Angle	3:00	Cr \geq 10	-	65	-	Deg	3	
	6:00		-	55	-			
	9:00		-	65	-			
	12:00		-	65	-			
Contrast Ratio	Cr	$\theta=0^\circ$	350	500	-	-	4	
Response Time	T _r +T _f	$\Phi=0^\circ$	-	20	-	ms	5	
Color of CIE Coordinate	W	x	$\theta=0^\circ$ $\Phi=0^\circ$	Typ- 0.05	Typ+ 0.05	-	1,6	
		y				-		
	R	x				0.28		-
		y				0.33		-
	G	x				0.51		-
		y				0.34		-
	B	x				0.31		-
		y				0.56		-
S	x	0.15	-					
	y	0.14	-					
NTSC Ratio	S	-	-	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 (Φ 5mm)

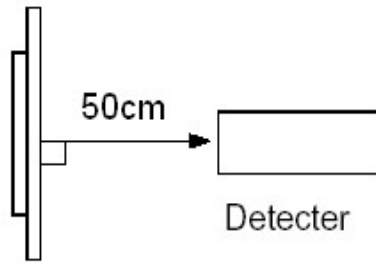
Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25 °C.
- 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

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turning on.

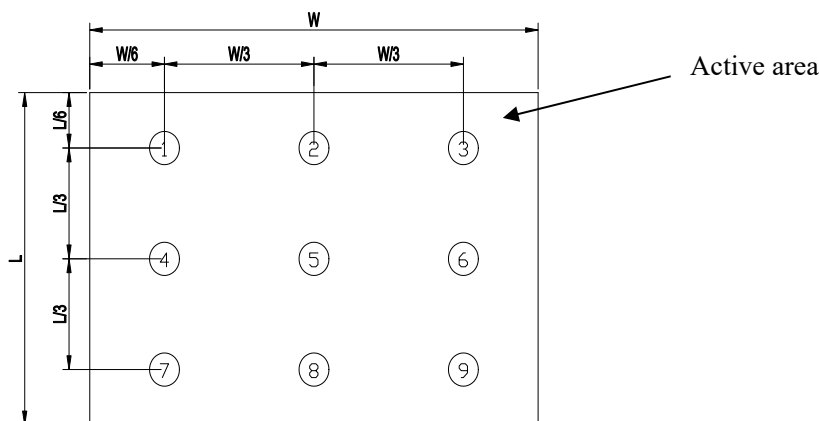


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

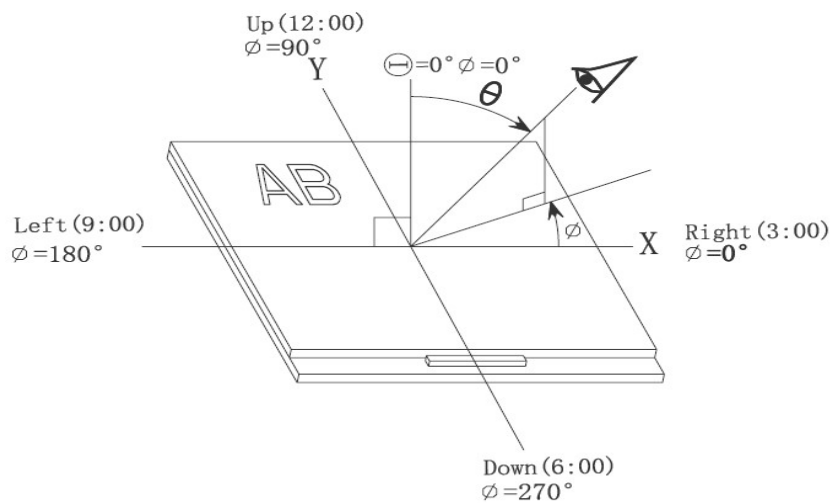
$Bp (\text{Max.})$ = Maximum brightness in 9 measured spots

$Bp (\text{Min.})$ = Minimum brightness in 9 measured spots.



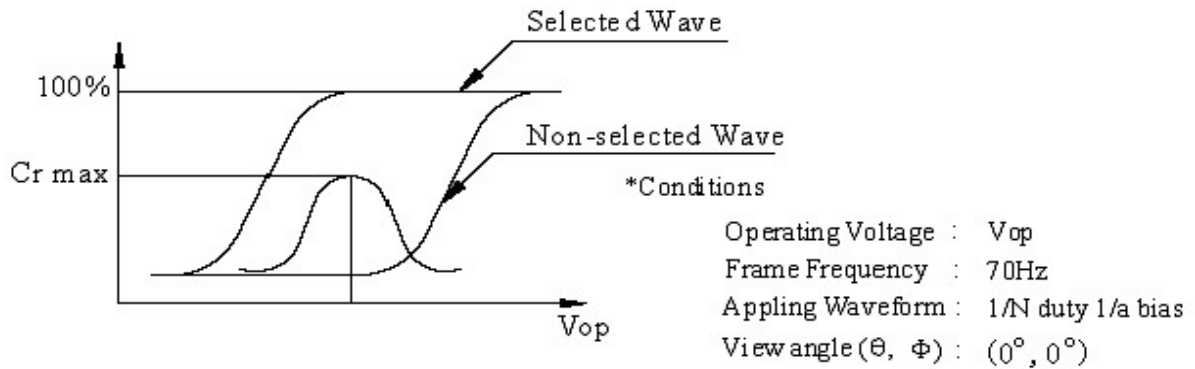
Note 3: The definition of viewing angle:

Refer to the graph below marked by ϑ and ϕ



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

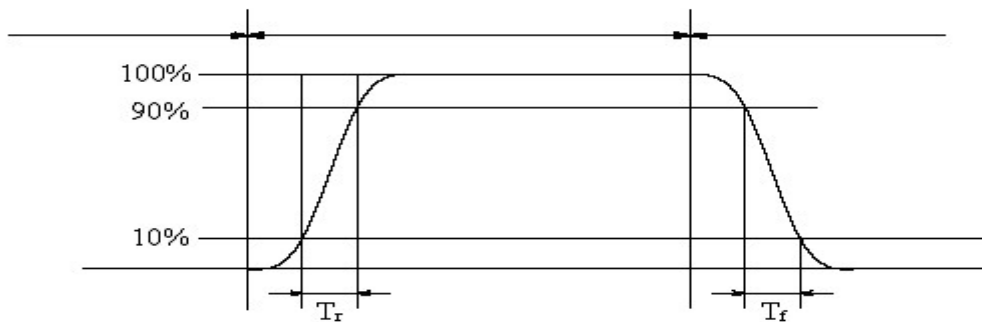
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$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

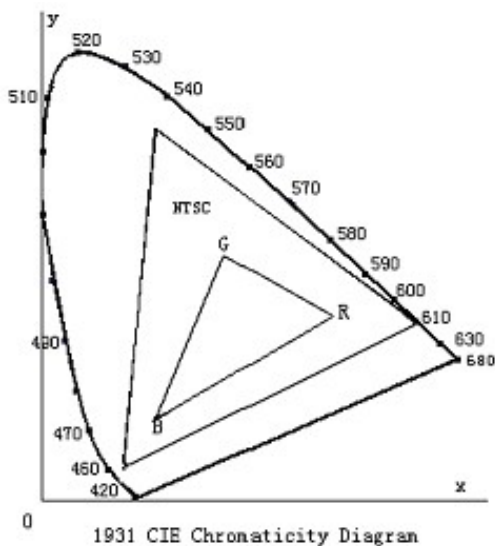
Note 5: Definition of Response time. (Test LCD using DMS501):

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.



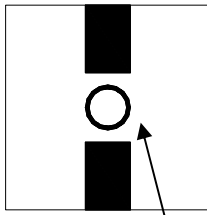
Color gamut:

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

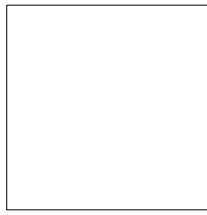
Note 7: Definition of cross talk.

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*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

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8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80°C±2°C 96H Restore 2H at 25°C 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°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	70°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	-20°C±2°C 96H Restore 4H at 25°C Power on	
5	High Temperature/Humidity Operation	60°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-30°C → 80°C 30min 5min 30min after 5 cycle, Restore 2H at 25°C 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

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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.

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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 °C ~ 40 °C

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
