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Production Custom designs Installation

Mechanical design



- ☒ Preliminary Specifications
☐ Final Specifications

Title	8.0-inch LCM Product Specifications
Model Name	ET080WU02-R
Version	0

Customer	
Approved by	Date
Notice: This Specification is subject to change without notice.	

Approved By	Prepared By
Leo	Aurice
2023-9-8	2023-9-8



REVISION HISTORY

Version	Description of Changes	Date	Prepared
0	First Edition	2023-9-8	Aurice



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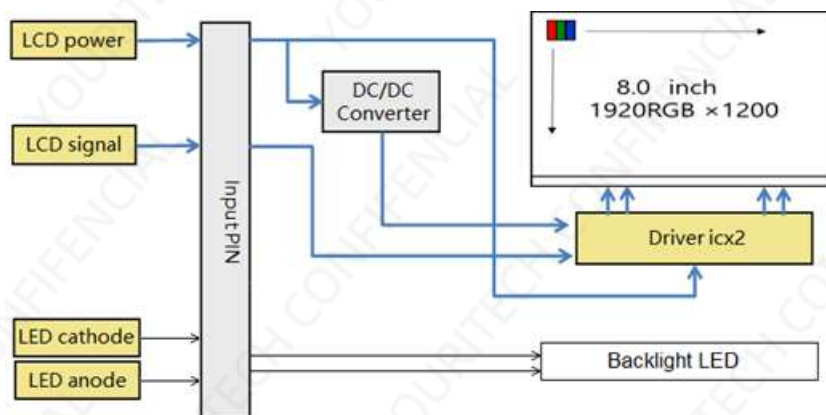
1. General Specifications

ET080WU02-R 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 1920 x 1200 pixels and can display up to 16.7M colors.

Item	Contents	Unit	Note
LCD size	8.0	inch	
Driver element	TFT		
Display mode	Normally Black		
Number of Pixels	1920(H)×RGB×1200(V)	pixels	
Module size	179.96(H)*119.92(V)*4.2	mm	1
Active Area(W×H)	172.22(H) x 107.64(V)	mm	
Pixel Pitch	29.9(H)x3x89.7(V)	μm	
Pixel Arrangement	RGB Vertical Stripe		
color	16.7M		
Surface treatment	HC		
Luminance	1500(Typ.)	nit	
Viewing Direction	85/85/85/85 (Typ.)	Deg.	
Color Gamut	75%(Typ.)		
Interface	2-port LVDS (8bit)		
IC	FL5893DA		
Power consumption	Panel : 1.22 (Typ.) Backlight : 5.46 (Typ.)	W	
Operating temperature	-30~+85	℃	
Storage temperature	-30~+85	℃	
Weight	147(Typ.)	g	

Note 1 : Refer to Mechanical Drawing. Without FPC and Connector etc.





2. Absolute Maximum Ratings

Absolute Maximum Ratings.

(Vss=0V ,Ta=25℃)

Parameter	Symbol	Min.	Max.	Unit	Remarks
Supply Voltage	VDDIN	-0.3	+6.0	V	
Operating Temperature	TOP	-30	+85	℃	
Storage Temperature	TST	-30	+85	℃	

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.VCC >VSS must be maintained.
- 3.Please be sure users are grounded when handing LCD Module.



3. Interface Pin Assignment

The Interface Connector assignments are listed in Table.

No.	Symbol	Function	No.	Symbol	Function
1	VLED-	Power for LED backlight (Cathode)	24	GND	Ground
2	VLED-	Power for LED backlight (Cathode)	25	OLV2P	LVDS differential data input Positive(ODD)
3	VLED+	Power for LED backlight (Anode)	26	OLV2N	LVDS differential data input Negative(ODD)
4	VLED+	Power for LED backlight (Anode)	27	GND	Ground
5	NC	No connection	28	OLVCLKP	LVDS differential clock input Positive(ODD)
6	GND	Ground	29	OLVCLKN	LVDS differential clock input Negative(ODD)
7	ELV3P	LVDS differential data input Positive(EVEN)	30	GND	Ground
8	ELV3N	LVDS differential data input Negative(EVEN)	31	OLV1P	LVDS differential data input Positive(ODD)
9	GND	Ground	32	OLV1N	LVDS differential data input Negative(ODD)
10	ELV2P	LVDS differential data input Positive(EVEN)	33	GND	Ground
11	ELV2N	LVDS differential data input Negative(EVEN)	34	OLV0P	LVDS differential data input Positive(ODD)
12	GND	Ground	35	OLV0N	LVDS differential data input Negative(ODD)
13	ELVCLKP	LVDS differential clock input Positive(EVEN)	36	GND	Ground
14	ELVCLKN	LVDS differential clock input Negative(EVEN)	37	I2C _SDA	data input/output for I2C(please let these pins open.)
15	GND	Ground	38	I2C _SCL	Clock signal for I2C(please let these pins open.)
16	ELV1P	LVDS differential data input Positive(EVEN)	39	VDD_OTP	Power supply for OTP circuit(please let these pins open.)
17	ELV1N	LVDS differential data input Negative(EVEN)	40	EEPEN	Only test Pin(please let these pins open.)
18	GND	Ground	41	VDDIN	Power supply
19	ELV0P	LVDS differential data input Positive(EVEN)	42	VDDIN	Power supply
20	ELV0N	LVDS differential data input Negative(EVEN)	43	VDDIN	Power supply
21	GND	Ground	44	VDDIN	Power supply
22	OLV3P	LVDS differential data input Positive(ODD)	45	VDDIN	Power supply
23	OLV3N	LVDS differential data input Negative(ODD)			

Connector : FH34SRJ-45S-0.5SH(50) or compatible

All terminals except NC terminal must be connected to input signal described as above or supply voltage or GND each.



4. Electrical Specifications

4.1 Electrical characteristics(V_{ss}=0V ,T_a=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Input Voltage	VDDI	3.0	3.3	3.6	V	T _a =25°C Note 1
Input Current	IDD	-	370	400	mA	Note 2
Power Consumption	-	-	1.22	1.32	W	

Note:

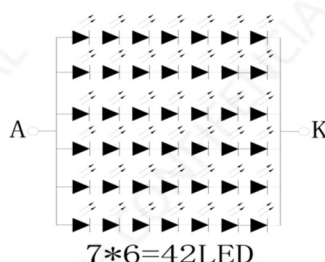
1. Stresses exceed the absolute maximum ratings listed above may cause permanent damage to IC. The IC should be operated under the condition of DC/AC characteristics for normal operation. If this condition is not met, the IC may be malfunctioned, or the reliability may drop. Parameters are valid in the operating temperature range unless otherwise specified. All voltages are with respect to VSS unless otherwise noted.
2. This current test is the actual current value tested under the L255 white pattern, for reference only.

4.2 LED Backlight specification

Item	Symbol	Min	Typ	Max	Unit	Note
Luminance	L _v	1350	1500	-	cd/m ²	
Forward Voltage	V _f	-	21.0	22.4	V	
Forward Current	I _F	-	260	-	mA	
Backlight Power consumption	W _{BL}	-	5.46	-	W	
LED Life time		50000	-	-	Hrs	

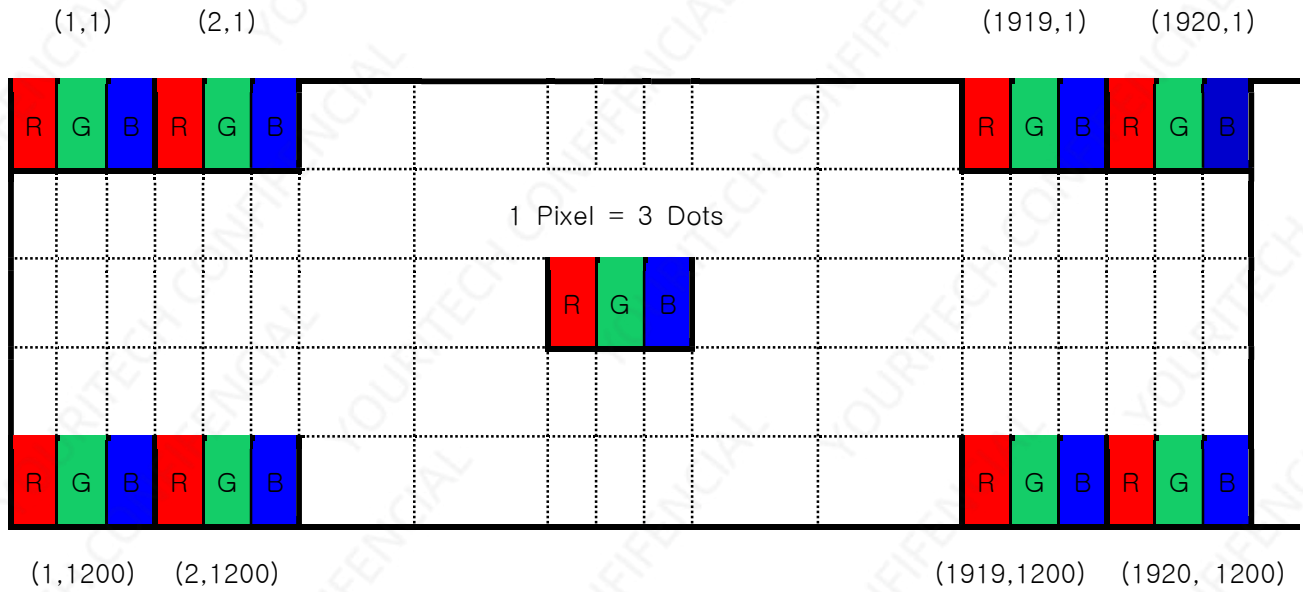
Note : Optical performance should be evaluated at T_a=25°C only.

Note : If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.



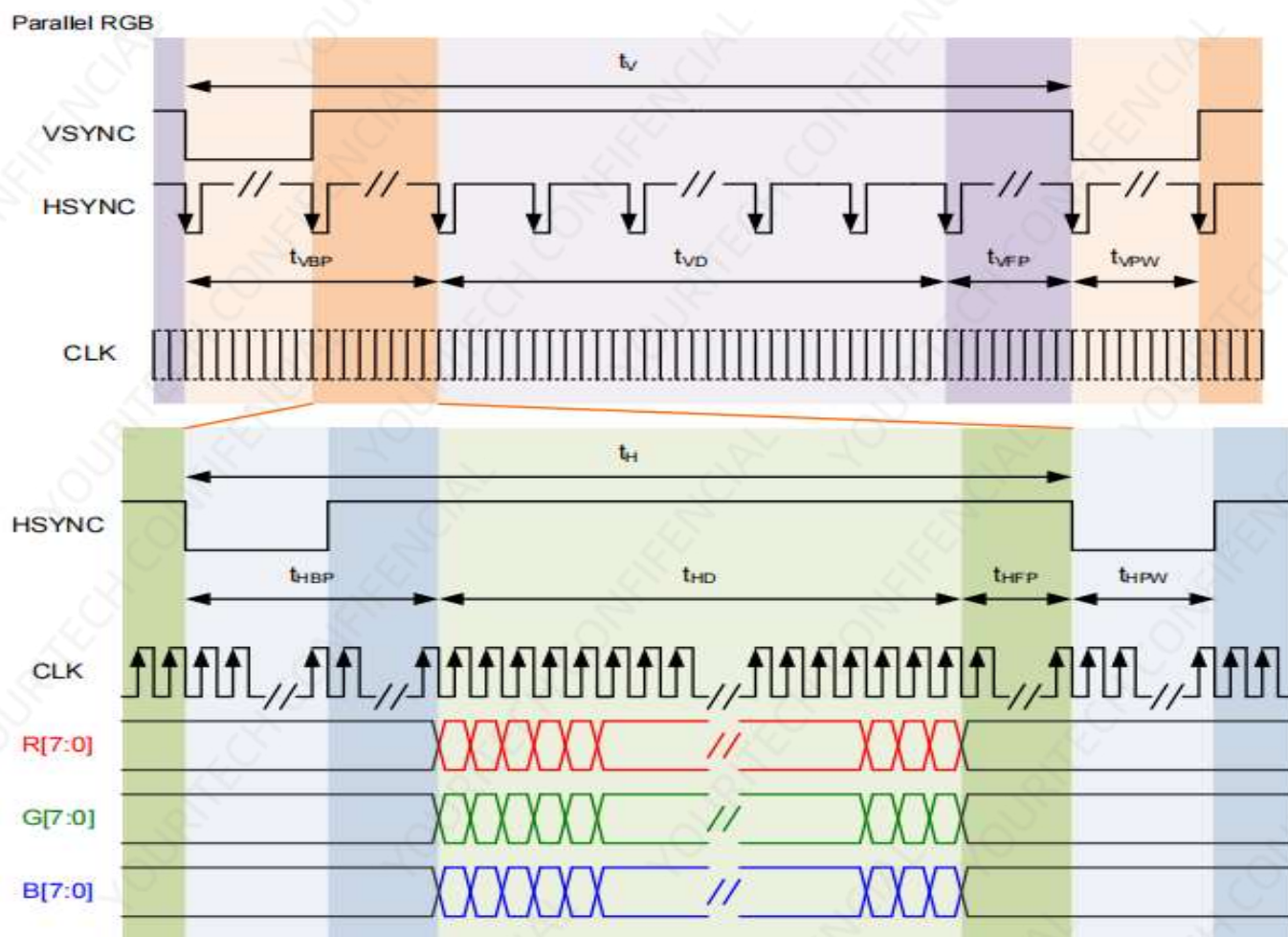
4.3 Data input Format

Pixel Format



4.4 LVDS Interface Timing

Timing Chart of Signals in LVDS Interface SYNC Mode



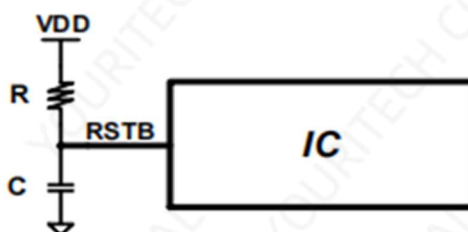
1920 x 1200(Only 2-Port)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	t_{CLK}	144.8	146.56	149.8	MHz	
Horizontal blanking time	t_{HBT}	48	50	96	t_{CLK}	$t_{HBP} + t_{HFP}$
Horizontal back porch	t_{HBP}	24	26	253	t_{CLK}	Include t_{HPW}
Horizontal display area	t_{HD}		1920		t_{CLK}	
Horizontal front porch	t_{HFP}	24	24	255	t_{CLK}	
Horizontal period	t_H	1968	1970	2019	t_{CLK}	
Horizontal pulse width	t_{HPW}	2	2	2	t_{CLK}	
Vertical blanking time	t_{VBT}	20	40	66	t_H	$t_{VBP} + t_{VFP}$
Vertical back porch	t_{VBP}	10	20	253	t_H	Include t_{VPW}
Vertical display area	t_{VD}		1200		t_H	
Vertical front porch	t_{VFP}	10	20	255	t_H	
Vertical period	t_V	1220	1240	1266	t_H	
Vertical pulse width	t_{VPW}	2	2	2	t_H	
Frame rate	FR	60	60	60	Hz	



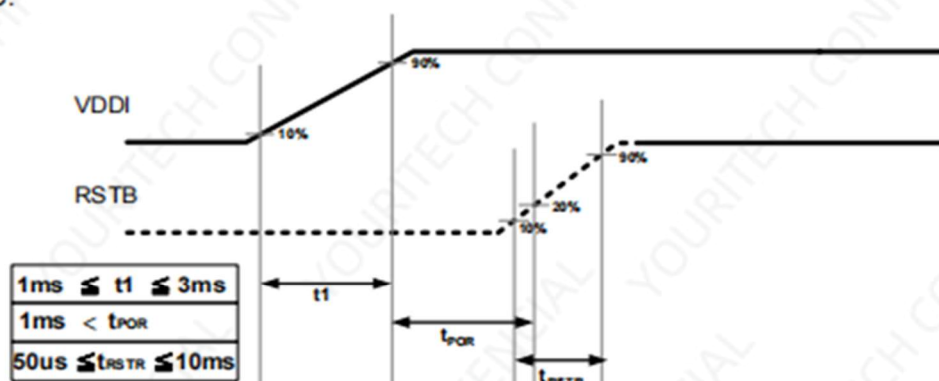
4.5 Reset Timing

Setting RSTB pin to “L” (hardware reset) can initialize internal function. Generally, VDDI is not stable at the time that the system power is just turned ON. The hardware reset is required to initialize internal registers after VDDI is stable. Initialized by RSTB pin is essential before operating. There are two suggestions for the hardware reset connection. One is RSTB controlled by MCU. The other is connecting an external RC circuit with RSTB pin, and the recommended RC circuit is $47\text{ K}\Omega \sim 200\text{ K}\Omega + 0.47\mu\text{F}$. (For $1\text{ ms} \leq t_1 \leq 3\text{ ms}$)

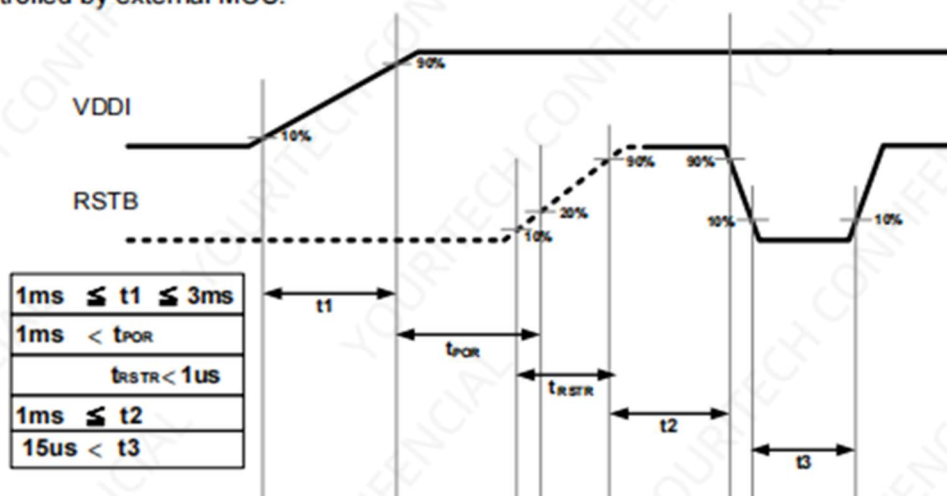


Recommend power on reset timing is shown as below.

* For RSTB pin +RC:



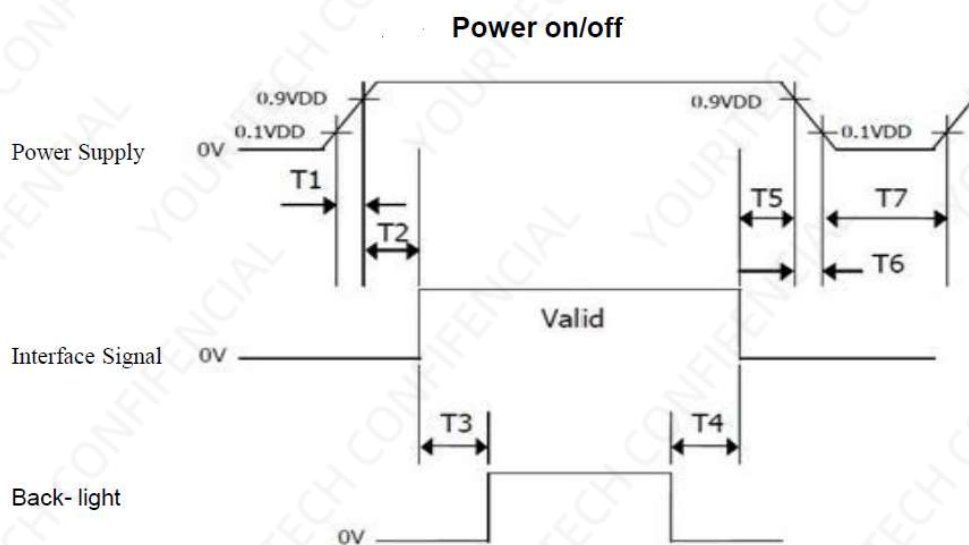
* For RSTB pin controlled by external MCU:



5. Power Sequence

5.1 Power ON/OFF Sequence

To prevent a latch-up or DC operation of the LCD, the power on/off sequence shall be as shown in below.



Parameter	Value			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms



6. Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Luminance	Lv		$\theta=0^{\circ}$ $\Phi=0^{\circ}$	1350	1500	-	cd/m ²	1
Uniformity	$\angle$ Bp			75	80	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	85	-	Deg	3
	6:00			-	85	-		
	9:00			-	85	-		
	12:00			-	85	-		
Contrast Ratio	CR		$\theta=0^{\circ}$ $\Phi=0^{\circ}$	800	1000	-	-	4
Response Time	T _r +T _f			-	30	35	ms	5
Color of CIE Coordinate	W	x	$\theta=0^{\circ}$ $\Phi=0^{\circ}$	(0.247)	(0.297)	(0.347)	-	1,6
		y		(0.300)	(0.350)	(0.400)	-	
	R	x		(0.609)	(0.659)	(0.709)	-	
		y		(0.287)	(0.337)	(0.387)	-	
	G	x		(0.244)	(0.294)	(0.344)	-	
		y		(0.590)	(0.640)	(0.690)	-	
	B	x		(0.095)	(0.145)	(0.195)	-	
		y		(0.041)	(0.091)	(0.141)	-	
NTSC Ratio	S			70	75	-	%	

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

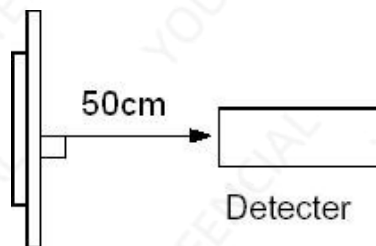


Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment PR-705 (Φ8mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: $T_a=25^{\circ}\text{C}$.
- 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 turning on.

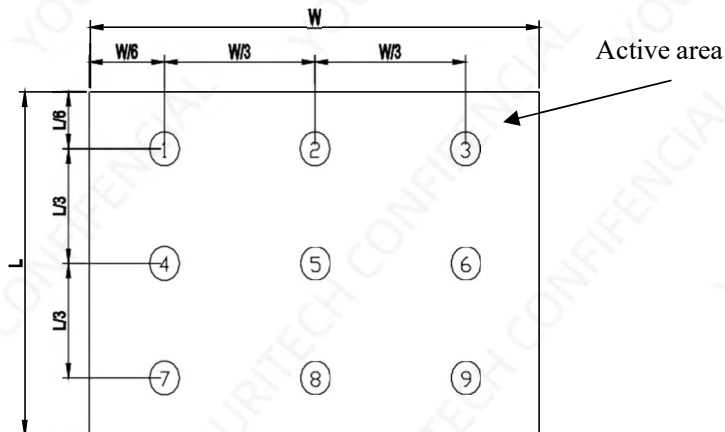


Note 2: The luminance uniformity is calculated by using following formula.

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

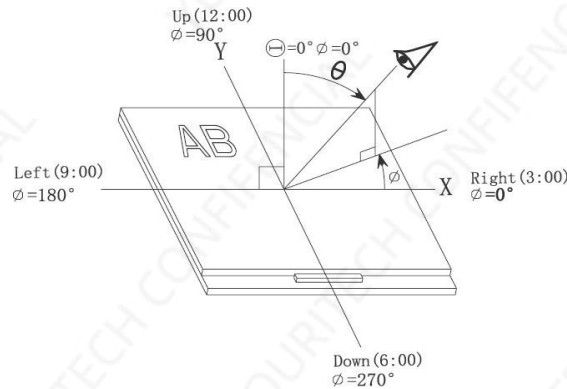
$B_p (\text{Max.})$ = Maximum brightness in 9 measured spots

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



Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and ϕ

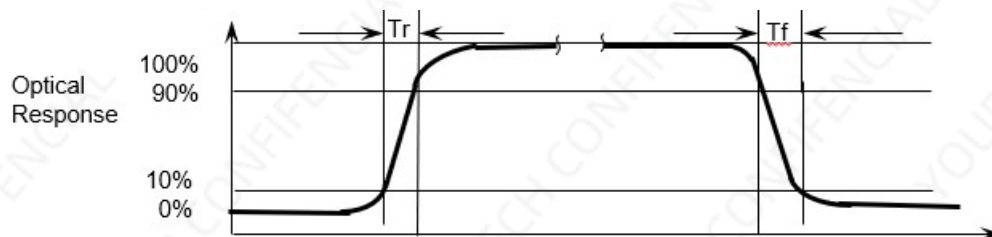


Note 4: Definition of contrast ratio.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

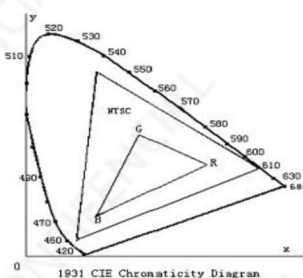
Note 5: Definition of Response time.

The electro-optical response time measurements shall be made as Figure by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_f .



The definition of response time

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



Color gamut:

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



7. Reliability Test Items

No.	Item	Test Conditions
1	High Temperature Storage	85℃ , 240hrs, Non-operational
2	Low Temperature Storage	-30℃ , 240hrs, Non-operational
3	High Temperature Operation	85℃ , 240hrs, operational
4	Low Temperature Operation	-30℃ , 240hrs, operational
5	High Temperature and High Humidity operation test	60℃ , 90%RH, 240hrs, operational
6	Thermal shock	-30℃ ←→ 80℃ , 1hr/cycle, 100 cycle, Non-operational

Note1: Temperature is the ambient temperature of sample.

Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at roomtemperature.

Note3: In the standard condition, there shall be no practical problem that may affect the display function. After thereliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.

Note4: Suitable operating time: under 12 hours a day. Long-term lighting products recommended regular shutdown.



8. General Precautions

1 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.
8. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
9. Pins of I/F connector shall not be touched directly with bare hands.

2 Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

3 Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.
3. Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
4. In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

4 Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.
4. It is not allowed to store or run directly in strong light or in high temperature and humidity for a long time; Strong light exposure causes degradation of polarizer and color filter.



5 Operation

1. Do not connect, disconnect the module in the “Power On” condition.
2. Power supply should always be turned on/off by following item “POWER ON OFF SEQUENCE”.
3. Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
4. The FPC cable between the LED chips and its converter power supply shall be a minimized length and be connected directly. The longer cable between the back-light and the converter may cause lower luminance of light source (LED).

6 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft cloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7 Other

1. Ultra-violet ray filter is necessary for outdoor operation.
2. Avoid condensation of water. It may result in improper operation or disconnection of electrode.
3. Do not exceed the absolute maximum rating value. (the supply voltage variation, input voltage variation, Variation in part contents and environmental temperature, so on) Otherwise the module may be damaged.
4. If the module displays the same pattern continuously for a long period of time, it can be the situation when the image “sticks” to the screen.
5. This module has its circuitry PCB's on the front or rear side and should be handled carefully in order not to be stressed.
6. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.



9. Mechanical Drawing

Unit : mm

