IDWay Technology Co. Ltd

PRODUCT SPECIFICATIONS

For Customer: _____ ☐ : APPROVAL FOR SPECIFICATION

Customer Model No. _____ ☐ : APPROVAL FOR SAMPLE

Module No.: *GZ70143-DIT495TH* *Date : 2023-10-27*

Table of Contents

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	APPROVER
YZJ		

2. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared
2023-10-27	V0		The first release	YZJ

3. General Specifications

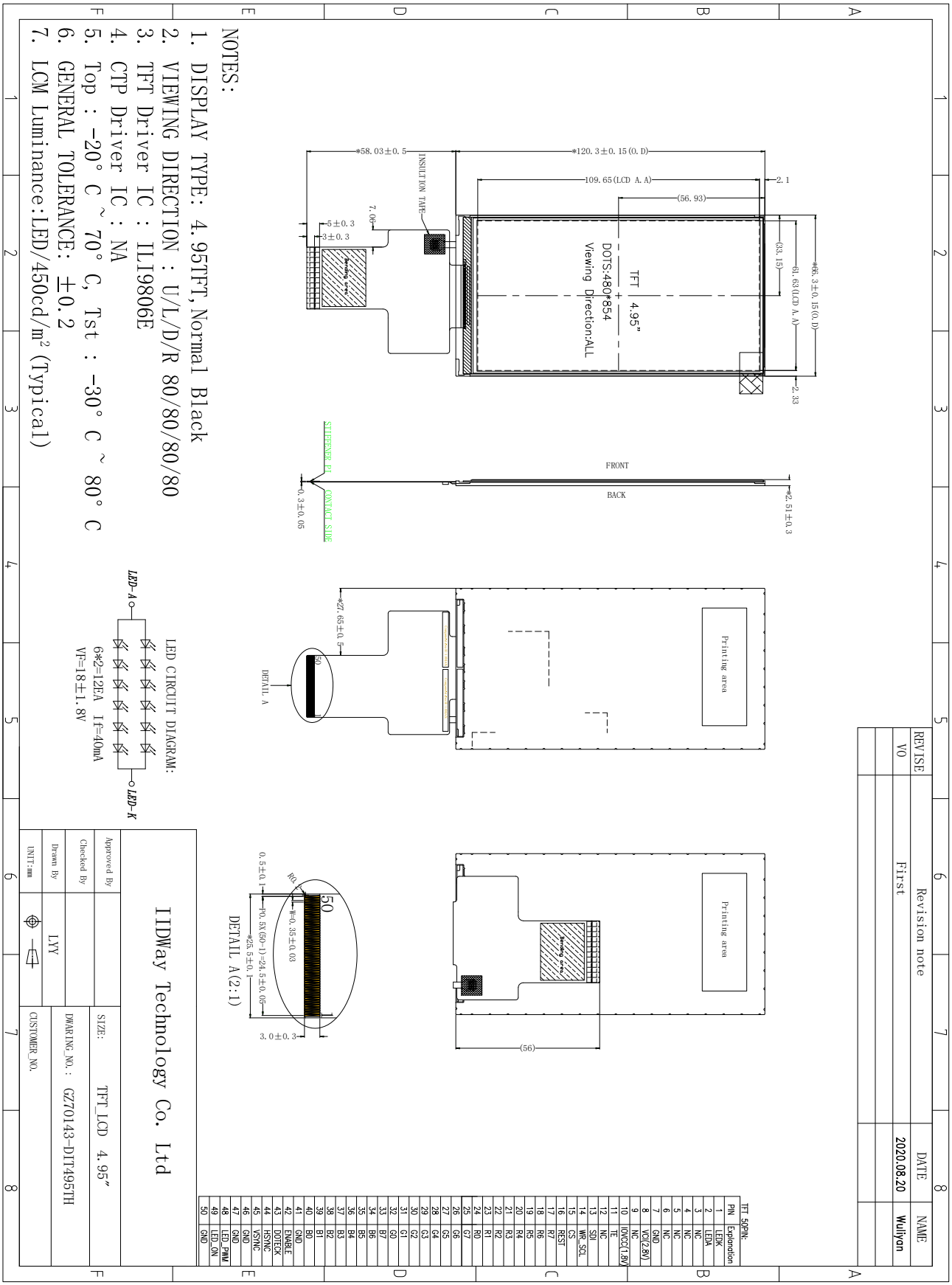
GZ70143-DIT495TH is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light unit and CTP. The 4.95″ display area contains 480 x854 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		1
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Active Area(W×H)	61.63X109.65	mm	
Number of Dots	*480 x854*	dots	
TFT Controller	ILI9806E	-	
Power Supply Voltage	2.8	V	
Backlight	6S2P-LEDs (white)	pcs	
Weight	---	g	
Interface	RGB	-	

Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.

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	VCI	-0.3	4.6	V	1，2
	IOVCC	-0.3	4.6	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. $V_{CI} > V_{SS}$ 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

Notes:

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

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

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VCI	Ta=25℃	2.5	2.8	3.6	V	
		IOVCC	Ta=25℃	1.65	1.8	3.6	V	
Input voltage	'H'	V_{IH}	Ta=25℃	0.7IOVCC	-	IOVCC	V	
	'L'	V_{IL}	Ta=25℃	0	-	0.3IOVCC	V	

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

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	Vf	If=40mA	16.2	18.0	19.8	V	
Uniformity	∆Bp	If=40mA	75	80	-	%	
Life Time	time	If=40mA	-	20K	-	hours	1

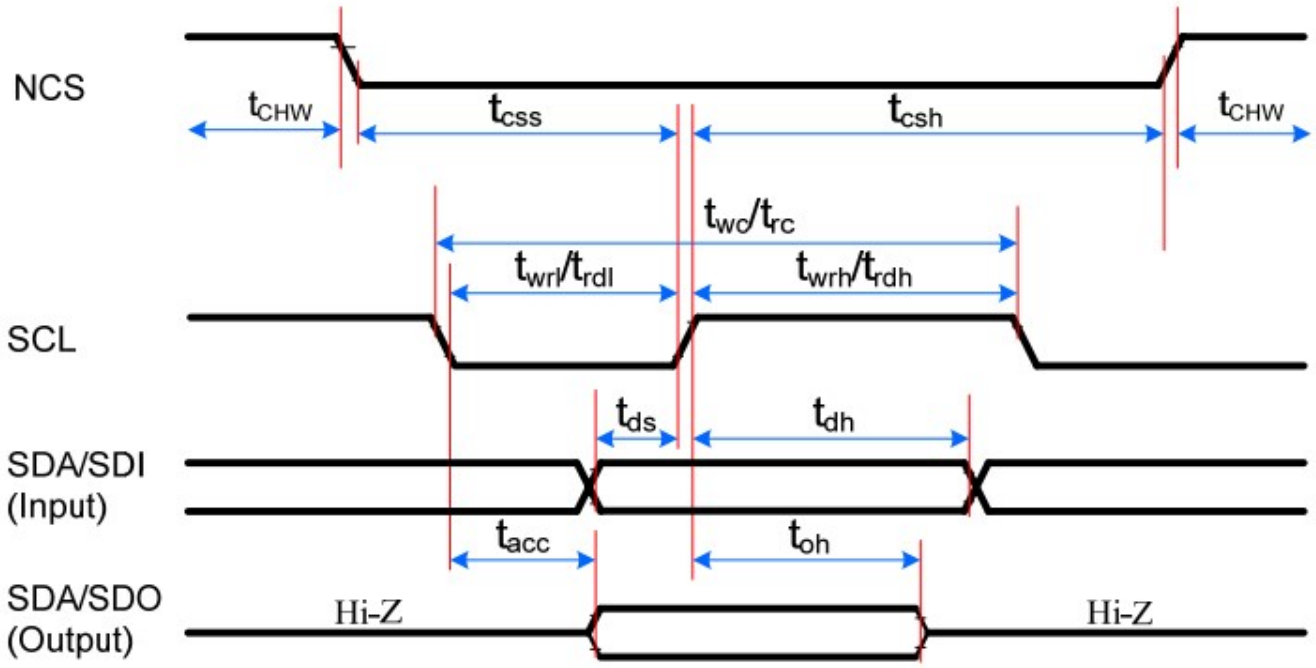
Note 1: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

6.3 Interface signals

Pin No.	Symbol	I/O	Function
1	LEDK	P	LED back light(Cathode)
2	LEDA	P	LED back light(Anode)
3-6	NC	-	No connection.
7	GND	P	Ground.
8	VCI	P	Power supply for Analog voltage
9	NC	-	No connection.
10	IOVCC	P	Power for IO voltage
11	TE	O	Tearing effect output pin.
12	NC	-	No connection.
13	SDI	I	Data input pin in serial mode.
14	WR_SCL	I	Clock pin of serial interface.
15	CS	I	Chip select pin of serial
16	REST	I	Reset pin
17-24	R7~R0	I	Red data bus
25-32	G7~G0	I	Green data bus
33-40	B7~B0	I	Blue data bus
41	GND	P	Ground.
42	ENABLE	I	Data enable pin
43	DOTECK	I	Data clock
44	HSYNC	I	Line sync signal
45	VSYNC	I	Frame sync signal
46-47	GND	P	Ground.
48	LED_PWM	O	The PWM frequency output for LED driver control.
49	LED_ON	O	Used for turning On/Off external LED backlight control.
50	GND	P	Ground.

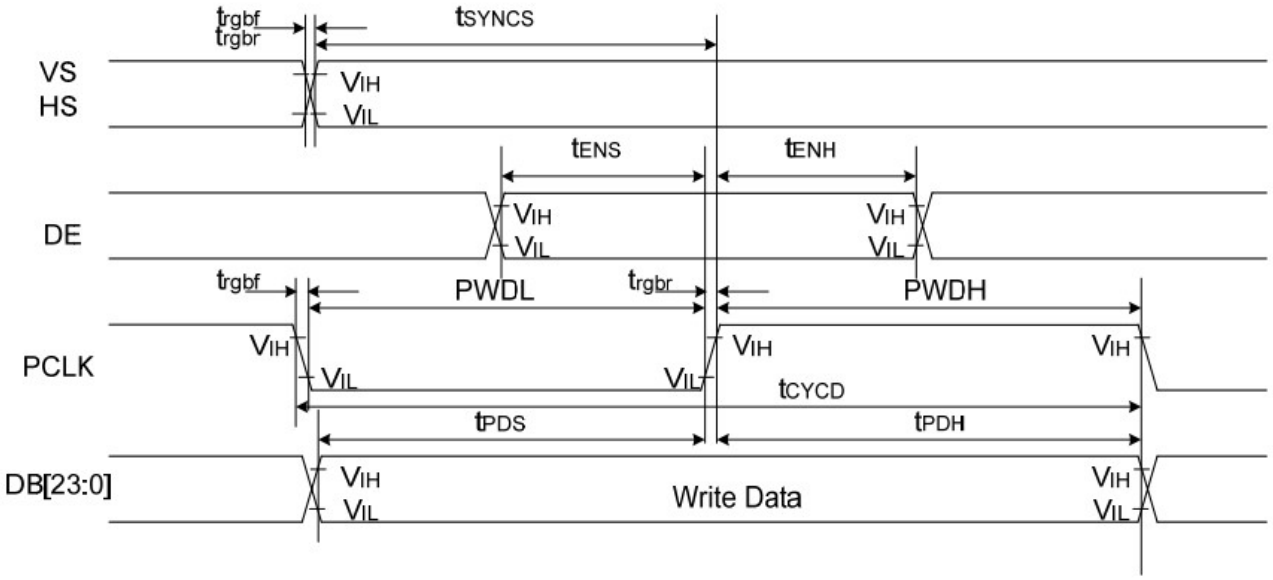
6.4 AC Characteristics

Display Serial Interface Timing Characteristics (3-line SPI system)



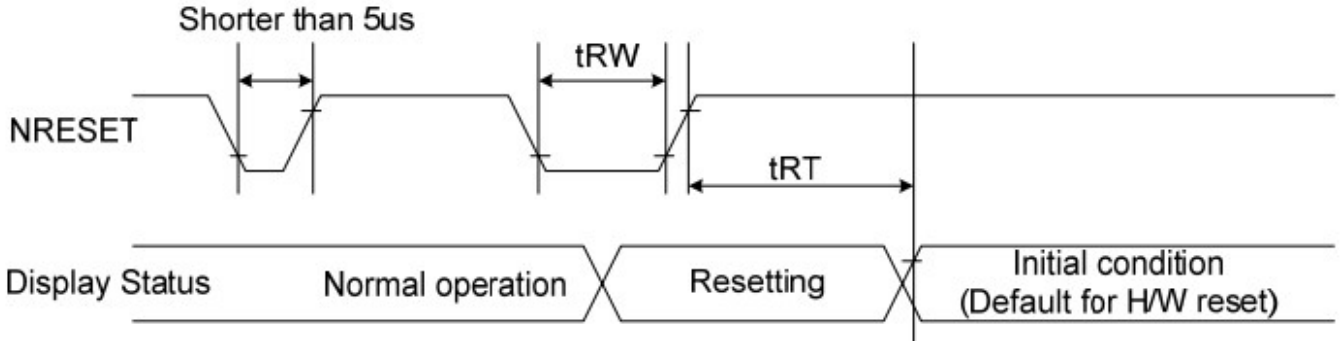
Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tcss	Chip select time (Write)	15	-	ns	
	tcsh	Chip select hold time (Read)	15	-	ns	
	tCHW	CS "H" pulse width	40	-	ns	
SCL	twc	Serial clock cycle (Write)	30	-	ns	
	twrh	SCL "H" pulse width (Write)	10	-	ns	
	twrl	SCL "L" pulse width (Write)	10	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL "H" pulse width (Read)	60	-	ns	
	trdl	SCL "L" pulse width (Read)	60	-	ns	
SDA/SDO (Output)	tacc	Access time (Read)	10	100	ns	For maximum CL=30pF
	toh	Output disable time (Read)	15	100	ns	For minimum CL=8pF
SDA/SDI (Input)	tds	Data setup time (Write)	10	-	ns	
	tdh	Data hold time (Write)	10	-	ns	

Parallel 24/18/16-bit RGB Interface Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VS/ HS	t_{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t_{SYNCH}	VS/HS hold time	5	-	ns	
DE	t_{ENS}	DE setup time	5	-	ns	
	t_{ENH}	DE hold time	5	-	ns	
DB[23:0]	t_{POS}	Data setup time	5	-	ns	
	t_{PDH}	Data hold time	5	-	ns	
PCLK	PWDH	PCLK high-level period	13	-	ns	
	PWDL	PCLK low-level period	13	-	ns	
	t_{CYCD}	PCLK cycle time	28	-	ns	
	t_{rgbr} , t_{rgbf}	PCLK,HS,VS rise/fall time	-	15	ns	

6.5 Reset Timing



Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		us
	tRT	Reset cancel		5(note 1,5)	ms
				120 (note 1,6,7)	ms

7. Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	-	450	-	Cd/m^2	1
Uniformity	⊿Bp			75	80	-	%	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°	640	800	-	-	4
Response Time	$T_{r+}T_f$			-	35	45	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ. -0.05	TBD	Typ. +0.05	-	1,6
		y			TBD		-	
	R	x			TBD		-	
		y			TBD		-	
	G	x			TBD		-	
		y			TBD		-	
	B	x			TBD		-	
		y			TBD		-	
NTSC Ratio	S			-	70	-	%	

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

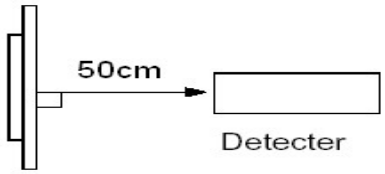
Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white.

*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.

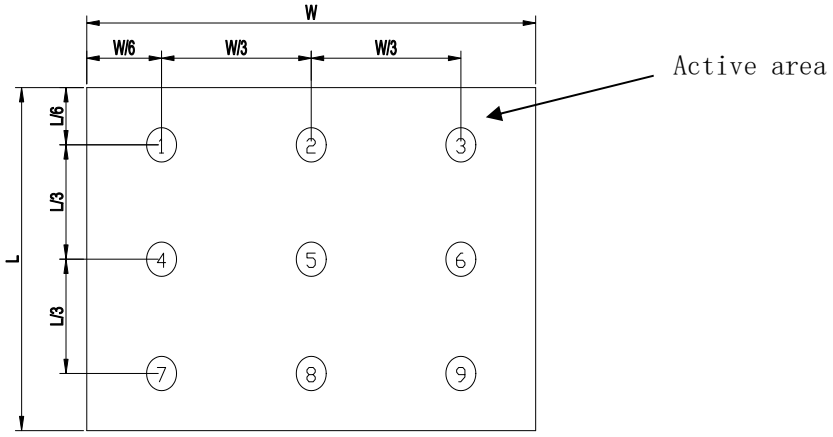


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

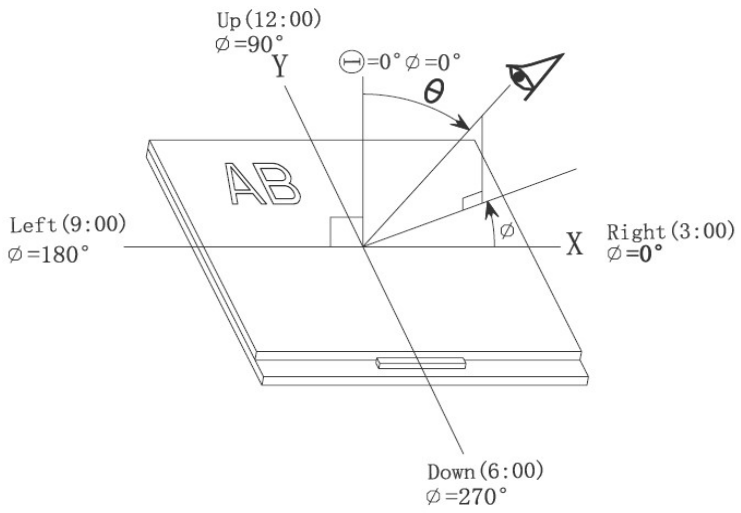
Bp (Max.) = Maximum brightness in 9 measured spots

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

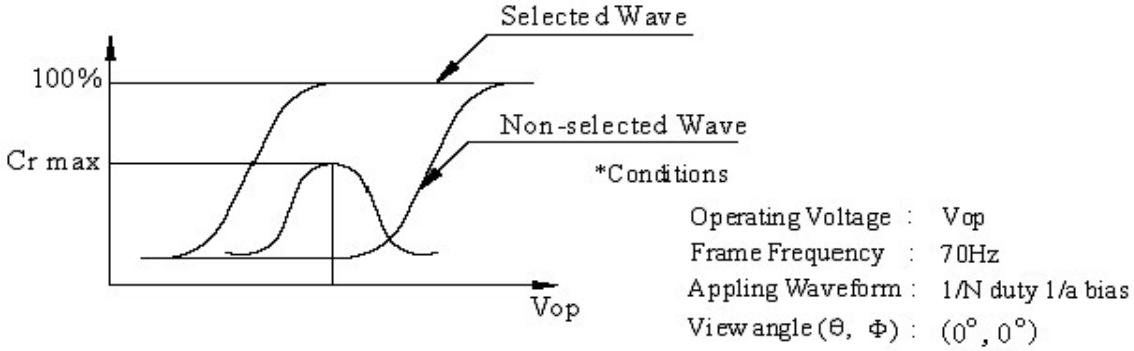


Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and Φ



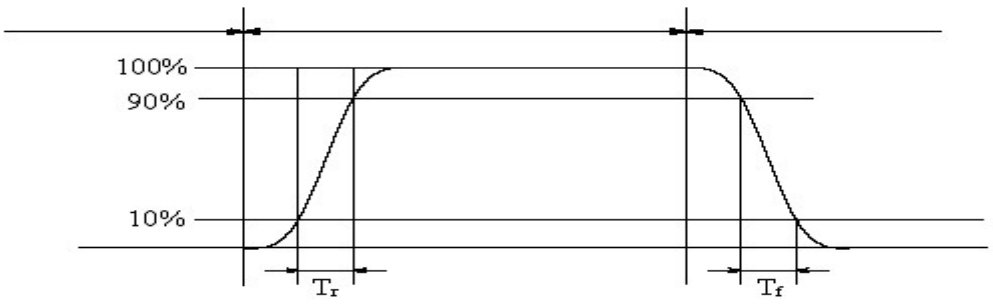
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



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

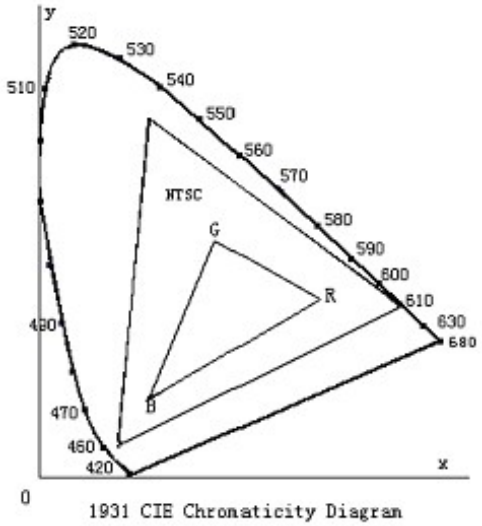
Note 5: Definition of Response time. (Test LCD using DMS501):

TThe 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

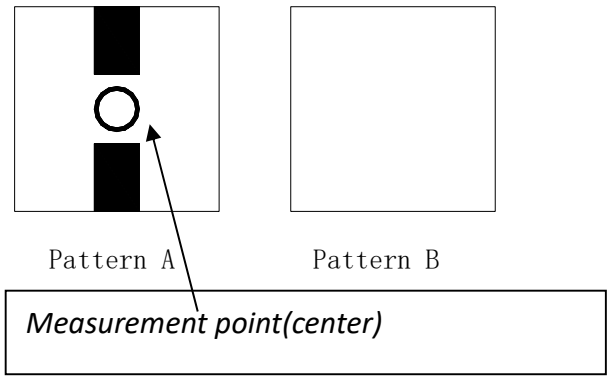
Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.



Color gamut:

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

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



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

Test Item	Test condition	Remark
High Temperature Storage	Ta = 80℃ 96hrs	Note1,Note3，4
Low Temperature Storage	Ta = -30℃ 96hrs	Note1,Note3，4
High Temperature Operation	Ta = 70℃ 96hrs	Note2,Note3，4
Low Temperature Operation	Ta = -20℃ 96hrs	Note1,Note3，4
Operation at High Temperature/Humidity	+60℃, 90%RH 96hrs	Note3，4
Thermal Shock	-30℃/30 min ~ +80℃/30 min for a total 10 cycles, Start with cold temperature and end with high temperature.	Note3，4

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time,at least 2 hours at room temperature

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