DISPLAY TECHNOLOGY
A **FORTEC** GROUP MEMBER

Disea Electronics Co., LTD

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PRODUCT SPECIFICATIONS

For Customer: __ _____ _____   □ : APPROVAL FOR SPECIFICATION

Customer Model No. _____   □ : APPROVAL FOR SAMPLE

Module No.: __ZW-T050HWSA-03CP__   _Date : 2020-06-16_____

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For Customer's Acceptance:

Approved By	Comment

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

2. Revision Record

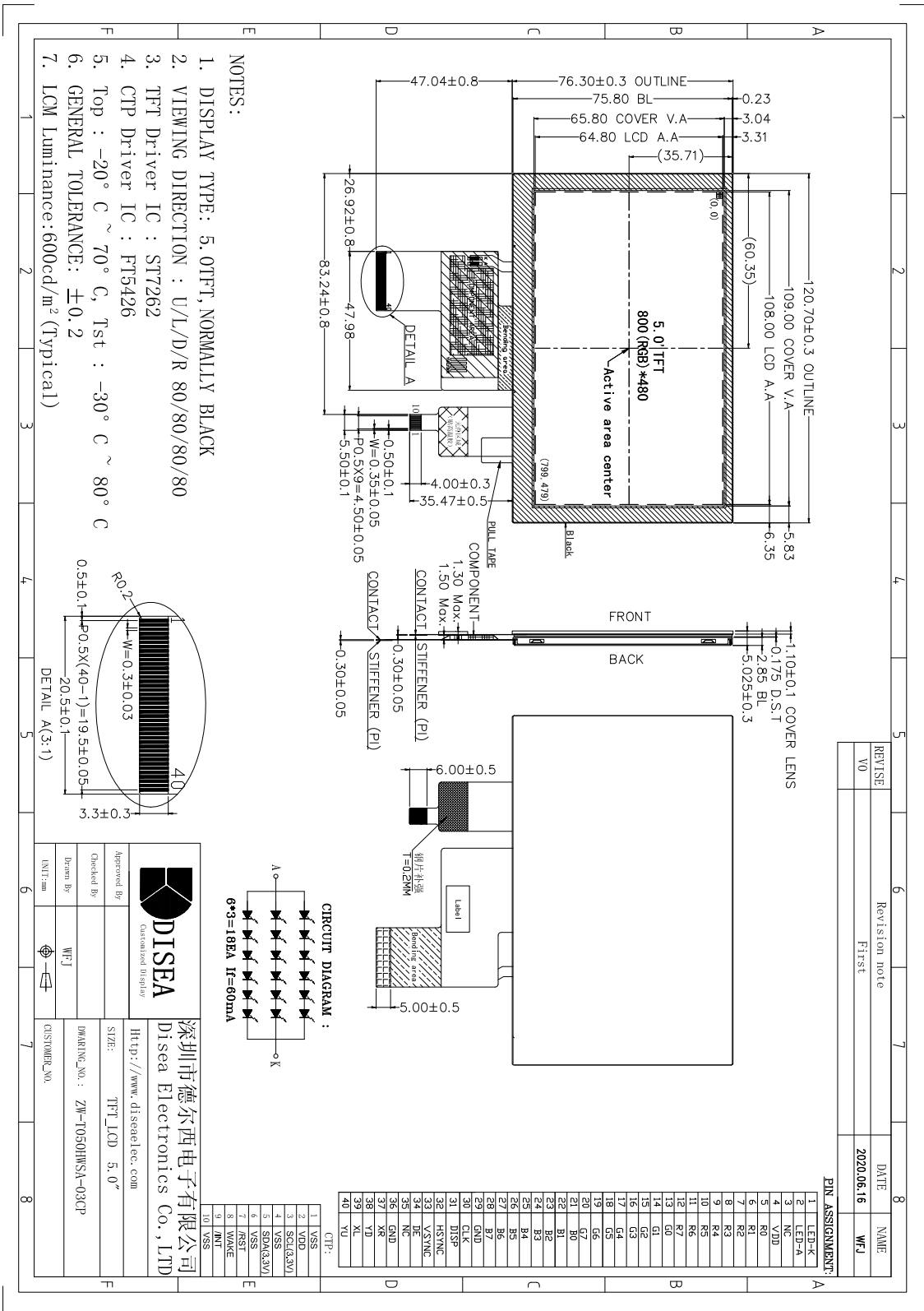| Date	Rev.No.	Page	Revision Items	Prepared
2020-06-16	V0		The first release	WFJ

3. General Specifications

ZW-T050HWSA-03CP is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light and CTP unit . The 5.0″ display area contains 800 x (RGB)x 480 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	℃	
Module size	120.70X76.30X5.025	mm	2
Active Area(W×H)	108.00X64.80	mm	
Number of Dots	800×480	dots	
Controller	ST7262	-	
CTP Controller	FT5426	-	
Power Supply Voltage	3.3	V	
Backlight	6S3P-LEDs (white)	pcs	
Weight	---	g	
Interface	RGB888	-	

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

Note 2:　Without FPC and Solder .With CTP.

4.Outline Drawing

NOTES:

1. DISPLAY TYPE: 5.0TFT, NORMALLY BLACK
2. VIEWING DIRECTION: U/L/D/R 80/80/80/80
3. TFT Driver IC: ST7262
4. CTP Driver IC: FT5426
5. Top: -20°C ~ 70°C, Tst: -30°C ~ 80°C
6. GENERAL TOLERANCE: ±0.2
7. LCM Luminance:600cd/m² (Typical)

CIRCUIT DIAGRAM:

6*3=18EA If=60mA

PIN ASSIGNMENT:

1	LED-K				
2	LED-A				
3	NC				
4	VDD				
5	R0				
6	R1				
7	R2				
8	R3				
9	R4				
10	R5				
11	R6				
12	R7				
13	G0				
14	G1				
15	G2				
16	G3				
17	G4				
18	G5				
19	G6				
20	G7				
21	B0				
22	B1				
23	B2				
24	B3				
25	B4				
26	B5				
27	B6				
28	B7				
29	GND				
30	CLK				
31	DISP				
32	HSYNC				
33	VSYNC				
34	DE				
35	NC				
36	GND				
37	XR				
38	YD				
39	XL				
40	YU				

CTP:
1	VSS
2	VDD
3	SCL(3.3V)
4	SDA(3.3V)
5	VSS
6	VSS
7	/RST
8	WAKE
9	/INT
10	VSS

CIRCUIT DIAGRAM:

深圳市德尔西电子有限公司
Disea Electronics Co., LTD

Http://www.diseaelec.com

DRAWING_NO.: ZW-T050HWSA-03CP

SIZE: TFT_LCD 5.0"

REVISE: V0

Revision note: First

DATE: 2020.06.16

NAME: WFJ

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	VDD	-0.3	4.0	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_{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		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		VDD	Ta=25℃	3.0	3.3	3.6	V	
Input voltage	'H'	V_{IH}	Ta=25℃	0.7*VDD	-	VDD	V	
	'L'	V_{IL}	Ta=25℃	0	-	0.3*VDD	V	

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

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	Vf	If=60mA	16.2	18.0	19.8	V	
Uniformity	△Bp	If=60mA	75	80	-	%	
Life Time	time	If=60mA	20K	-	-	hours	1
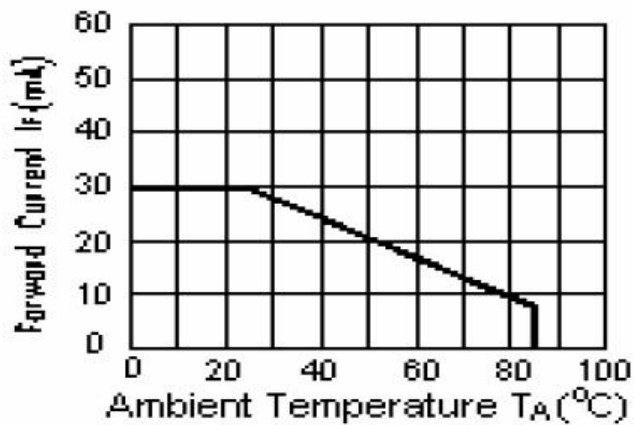
Note 1:   Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

6.3 Interface signals(LCM)

Pin No.	Symbol	I/O	Function
1	LED-K	P	LED back light(Cathode)
2	LED-A	P	LED back light(Anode)
3	NC	-	No connection.
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	CLK	I	Data clock
31	DISP	I	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	I	RTP control pin,no use please NC.
38	YD	I	
39	XL	I	
40	YU	I	

CTP interface

Pin No	Symbol	I/O	Function
1	VSS	P	Ground
2	VDD	P	CTP Power supply
3	SCL	I	I2C CLOCK
4	VSS	P	Ground
5	SDA	I	I2C DATA
6	VSS	P	Ground
7	/RST	I	CTP RESET pin,Active"L"
8	WAKE	I	External Reset, no use please NC
9	/INT	I	External Interrupt to the IC of CTP
10	VSS	P	Ground

6.4 AC Characteristics

6.4.1 AC Characteristics

System Bus Timing for RGB Interface
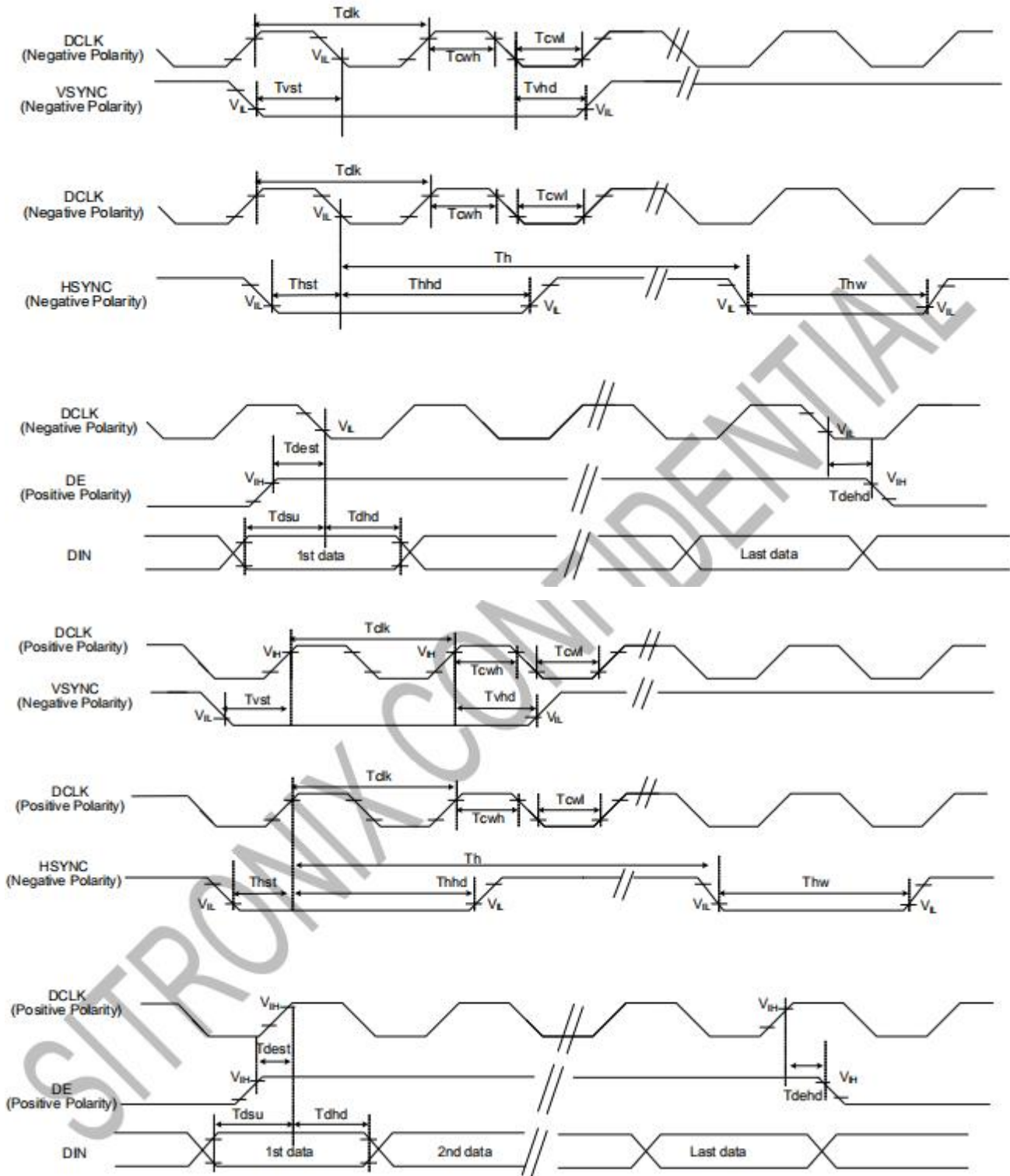
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	Tcw	40	50	60	%	
HSYNC Width	Thw	2	-	-	DCLK	
HSYNC Period	Th	55	60	65	us	
VSYNC Setup Time	Tvst	10	-	-	ns	
VSYNC Hold Time	Tvhd	10	-	-	ns	
HSYNC Setup Time	Thst	10	-	-	ns	
HSYNC Hold Time	Thhd	10	-	-	ns	
Data Setup Time	Tdsu	10	-	-	ns	
Data Hold Time	Tdhd	10	-	-	ns	
DE Setup Time	Tdest	10	-	-	ns	
DE Hold Time	Tdehd	10	-	-	ns	

6.4.2 Parallel RGB Timing Table

Parallel 24-bit RGB Interface Timing Table						
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

SYNC-DE Mode Timing Diagram
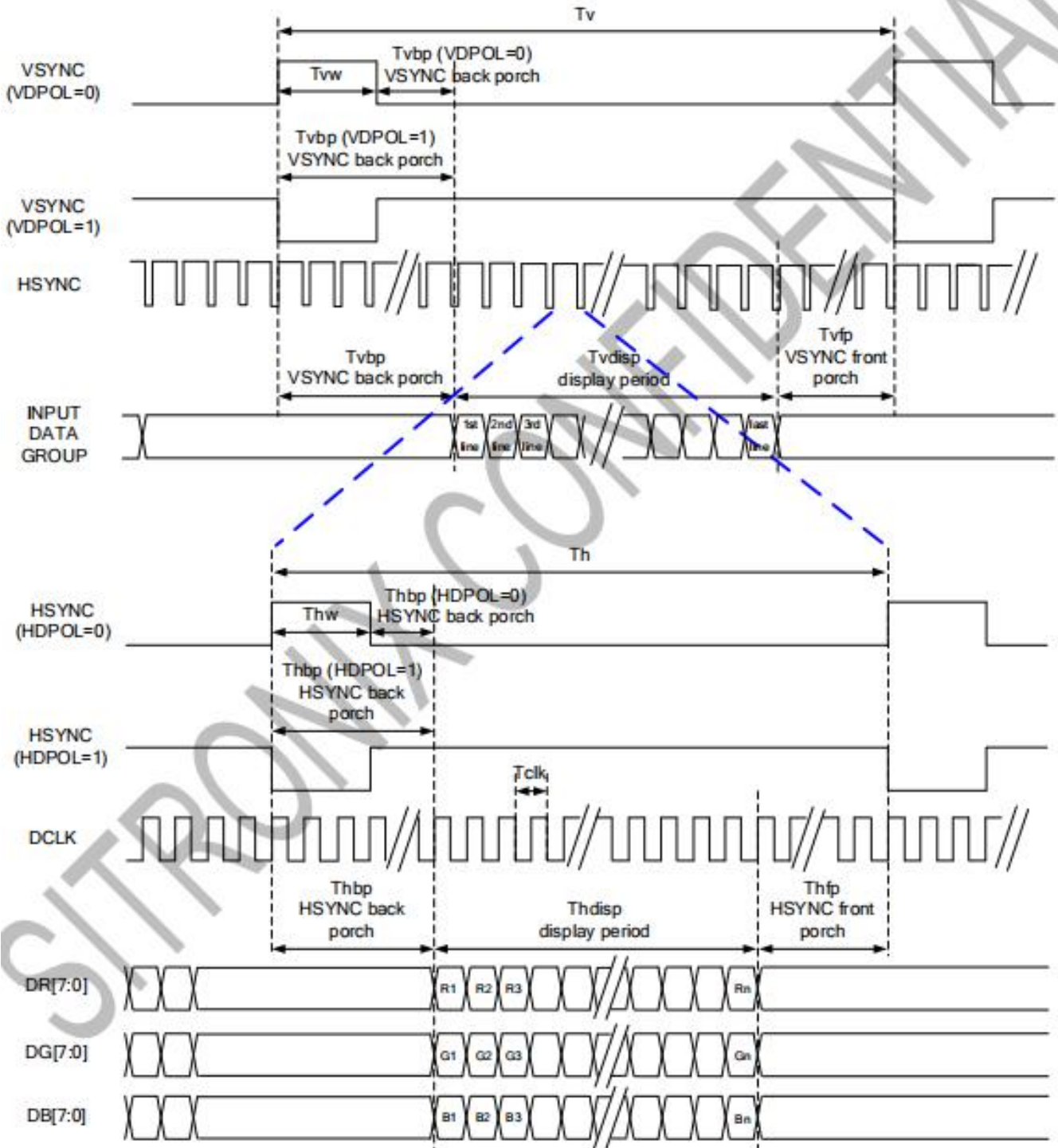
SYNC Mode Timing Diagram
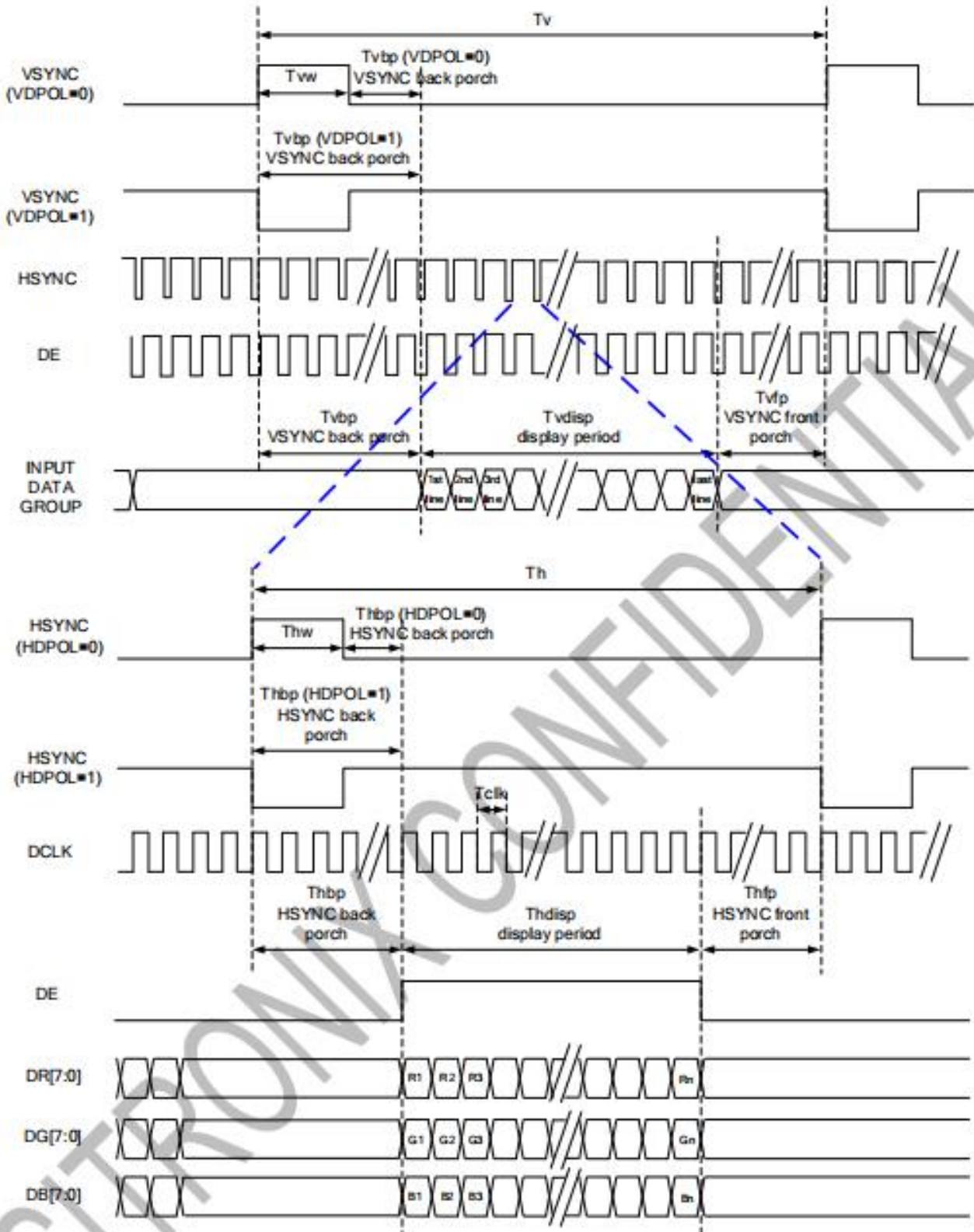
DE Mode
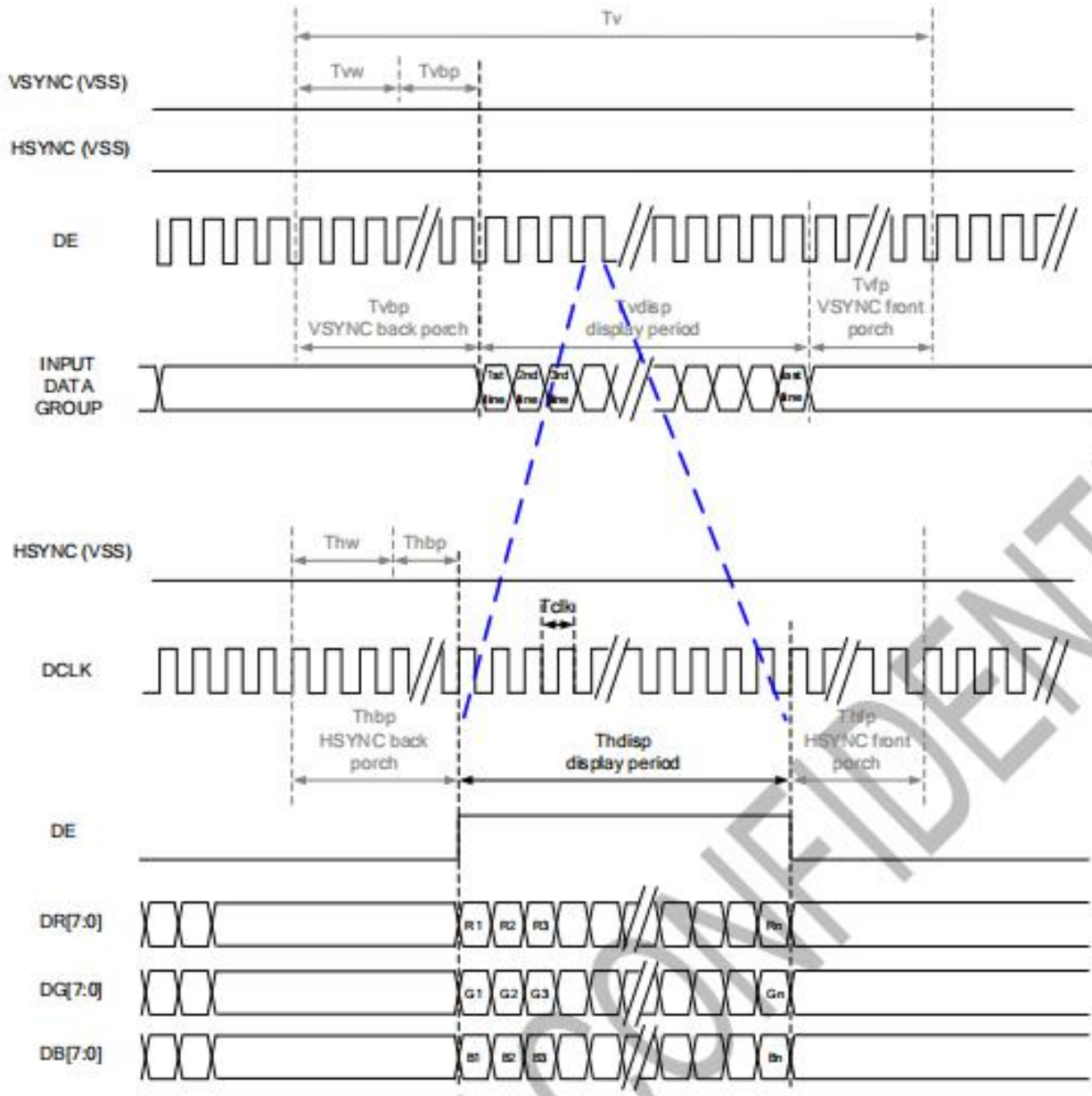
7. *Optical Characteristics*

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	-	600	-	Cd/m^2	1
Uniformity	$\triangle$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°	800	1000	-	-	4
Response Time	$T_{r+}T_f$			-	30	40	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ -0.05	0.325	Typ +0.05	-	1,6
		y			0.348		-	
	R	x			0.620		-	
		y			0.328		-	
	G	x			0.334		-	
		y			0.544		-	
	B	x			0.136		-	
		y			0.143		-	
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 equipment 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.
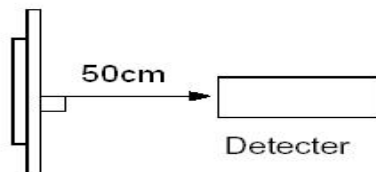
Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

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

Bp (Min.) = Minimum brightness in 9 measured spots.
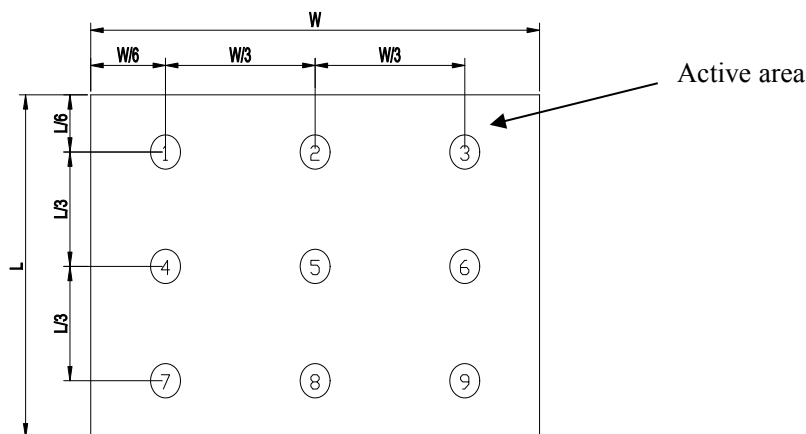
Note 3: The definition of viewing angle:
*Refer to the graph below marked by θ and Φ*
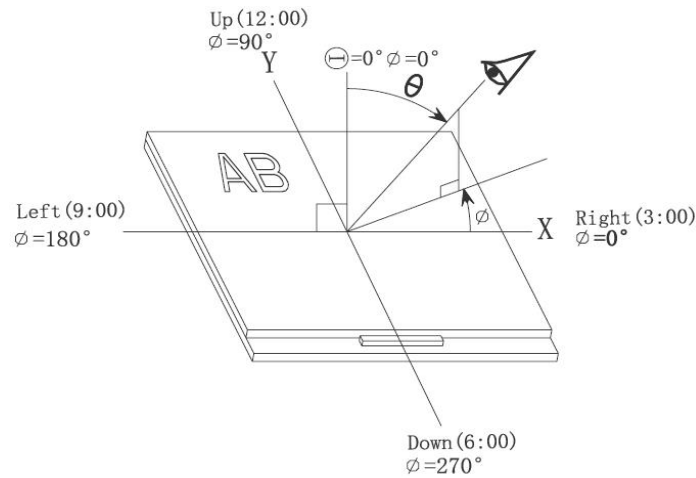
Note 4: Definition of contrast ratio.(Test LCD using DMS501)
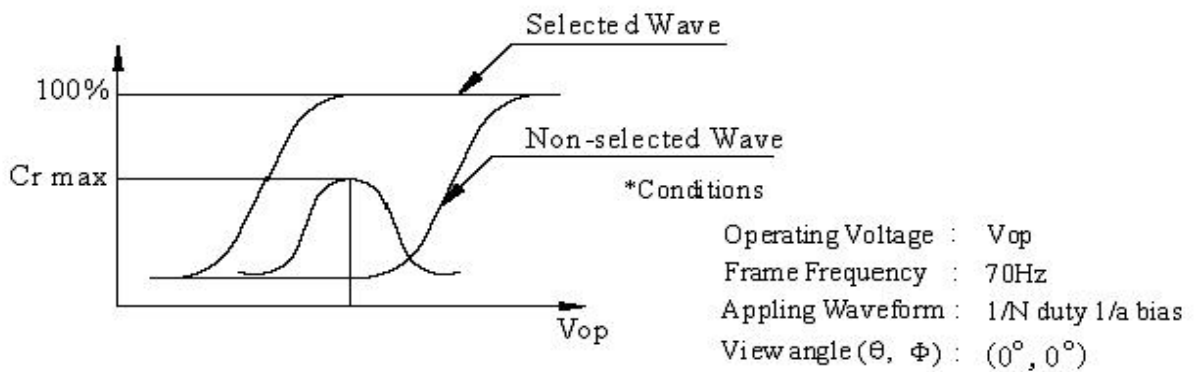
$$Contrast\ ratio(Cr) = \frac{Brightness\ of\ selected\ dots}{Brightness\ of\ non-selected\ dots}$$

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.
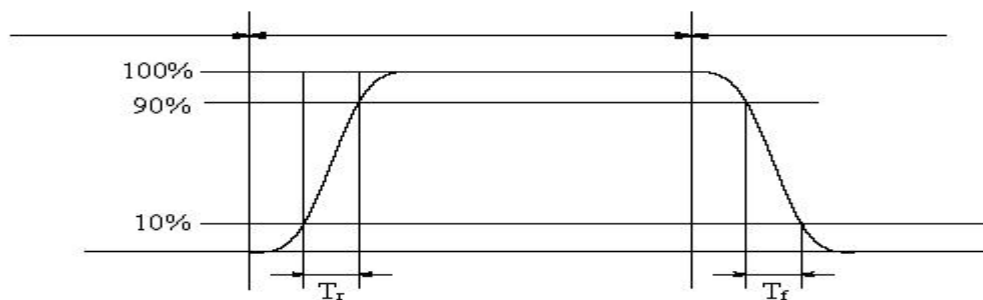
The definition of response time

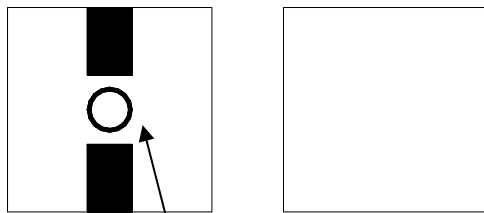*Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.*

1931 CIE Chromaticity Diagram
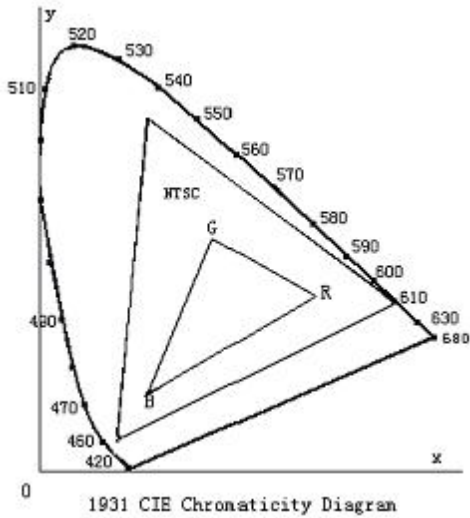
Color gamut:

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

Note 7: Definition of cross talk.

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

Pattern A   Pattern B

Measurement point(center)

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
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height:60cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	±2KV, Human Body Mode, 100pF/1500Ω	

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.

<u>*END*</u>