DLC Display Co., Limited

德爾西顯示器有限公司

MODEL No: DLC0700NOG

TEL: 86-755-86029824

FAX: 86-755-86029827

E-MAIL: sales@dlcdisplay.com

WEB: www.dlcdisplay.com

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Record of Revision

Date	Revision No.	Summary
2015-07-03	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC0700NOG active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 7.0'' display area contains 800X3(RGB) x 480pixels.

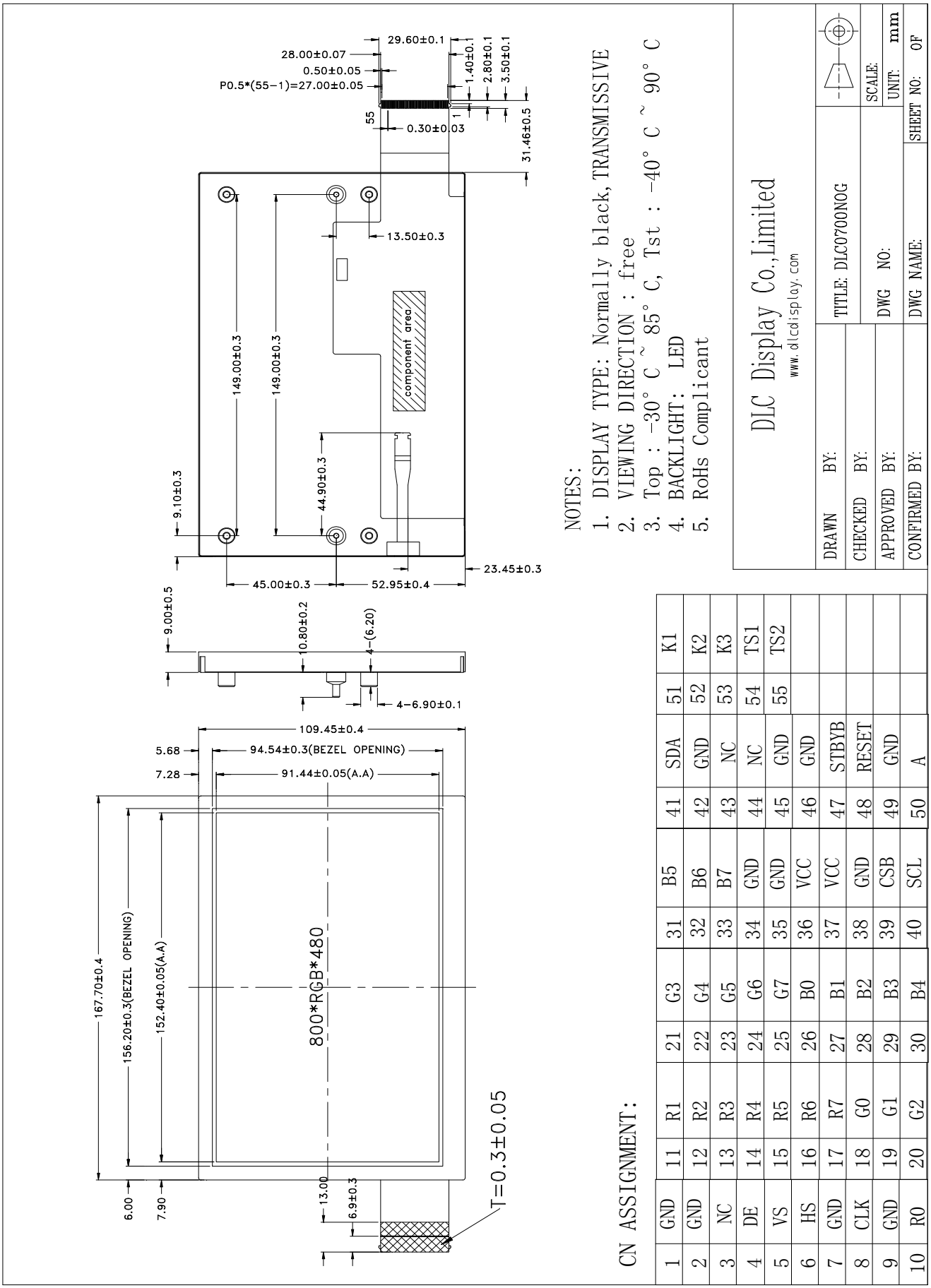
2. Application

Digital equipments which need color display, mobile navigator/video systems.

3. General Information

Item	Contents	Unit
Size	7.0	inch
Resolution	800x 3(RGB) x 480	/
Interface	TTL	/
Technology type	IPS TFT	/
Pixel pitch	0.1905x0.1905	mm
Pixel Configuration	RGB stripes	
Outline Dimension (W x H x D)	167.70x109.45x9.00	mm
Active Area	152.40x 91.44	mm
Display Mode	Transmissive， Normally Black	/
Backlight Type	LED	/
Driving-IC	Source: HX8298-A/ Gate: HX8695-E	
Weight	TBD	g

4. Outline Drawing



CN ASSIGNMENT:

1	GND	11	R1	21	G3	31	B5	41	SDA	51	K1												
2	GND	12	R2	22	G4	32	B6	42	GND	52	K2												
3	NC	13	R3	23	G5	33	B7	43	NC	53	K3												
4	DE	14	R4	24	G6	34	GND	44	NC	54	TS1												
5	VS	15	R5	25	G7	35	GND	45	GND	55	TS2												
6	HS	16	R6	26	B0	36	VCC	46	GND														
7	GND	17	R7	27	B1	37	VCC	47	STBYB														
8	CLK	18	G0	28	B2	38	GND	48	RESET														
9	GND	19	G1	29	B3	39	CSB	49	GND														
10	R0	20	G2	30	B4	40	SCL	50	A														

5. Interface signals

TTL Connector is used for the module electronic interface.
The recommended model is “50671-05541-001”.

No.	Symbol	Functions
1~2	GND	Ground
3	NC	No conncetion
4	DE	TTL signal data enable
5	VS	TTL signal Vertical sync
6	HS	TTL signal Horizontal sync
7	GND	Ground
8	CLK	TTL signal clock
9	GND	Ground
10~17	R7~R0	TTL signal data bus R
18~25	G7~G0	TTL signal data bus G
26~33	B7~B0	TTL signal data bus B
34~35	GND	Ground
36~37	VCC	Input power supply 3.3V
38	GND	Ground
39	CSB	SPI interface chip select
40	SCL	SPI interface clock
41	SDA	SPI interface data bus
42	GND	Ground
43~44	NC	No connection
45~46	GND	Ground
47	STBYB	Standby
48	RESET	Reset
49	GND	Ground
50	A	LED Anode
51	K1	LED Cathode1
52	K2	LED Cathode2
53	K3	LED Cathode3
54	TS1	Temp. sensor 1
55	TS2	Temp. sensor 2

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power Supply voltage	VCC	-0.3	3.96	V	
Driver supply voltage	VDD	-0.3	3.96	V	

6.2. Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-30	85	℃	
Storage Temperature	TSTG	-40	90	℃	

Note:
If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

7. Electrical Specifications

7.1 Electrical characteristics

Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Input Voltage	VCC	3.1	3.3	3.6	V	
Power Supply Current	I_F	TBD	TBD	TBD	mA	
Input Voltage	VIL	-0.3	--	0.3VDD	V	
	VIH	0.7VDD	--	VDD+0.3	V	

Note:

Frame rate=60HZ, Typ. Pattern White pattern, worst case pattern 1×1 checker 25℃.

7.2 LED Backlight

Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	--	160	--	mA	
Forward Voltage	VF	--	24	--	V	
Power Consumption	P_{LED}	--	3.84	--	W	
LED life time	--	20,000	--	--	Hrs	Note 3

Note : The LED Life-time define as the estimated time to 50% degradation of initial luminous.

8. Command/AC Timing

8.1 TTL interface timing (Sync mode)

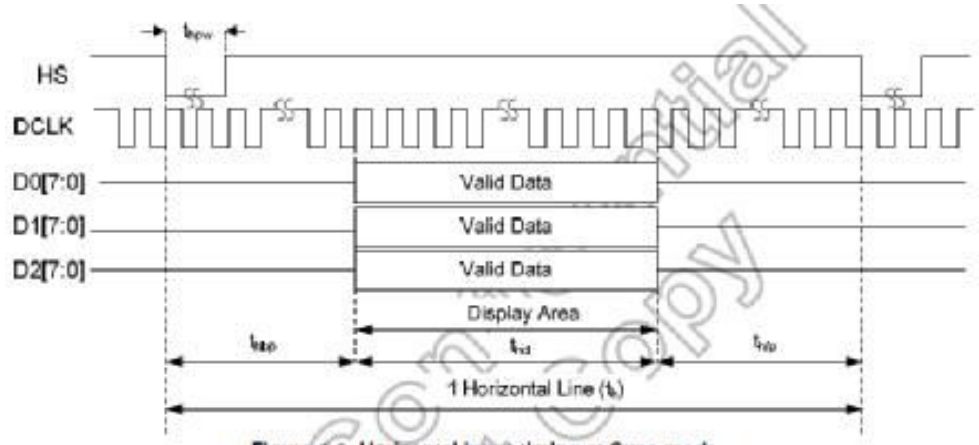


Figure 6.6: Horizontal input timing at Sync mode

• Vertical

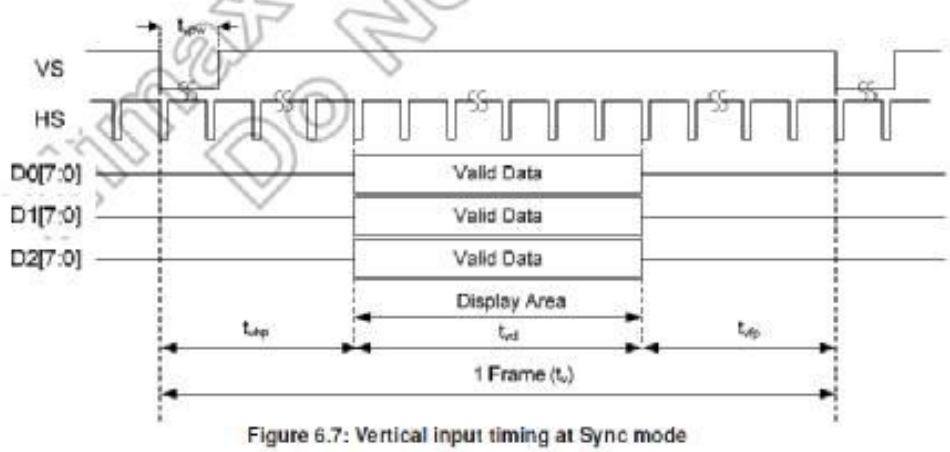


Figure 6.7: Vertical input timing at Sync mode

Parameter	Symbol	800xRGBx480			Unit
		Min.	Typ.	Max.	
DCLK Frequency	F_{DCLK}	-	26.4	-	MHz
Horizontal valid data	t_{hd}		800		DCLK
Hsync Pulse Width	t_{hpw}	3	8	254	DCLK
Hsync back porch	t_{hbp}	5	16	255	DCLK
Hsync front porch	t_{hfp}	16	16	315	DCLK
1 Horizontal Line	t_h	824	832	1120	DCLK
Vertical valid data	t_{vd}		480		H
Vsync Pulse With	t_{vpw}	1	2	87	H
Vsync back With	t_{vbp}	2	5	88	H
Vsync front porch	t_{vfp}	8	43	94	H
1 Vertical field	t_v	490	528	576	H
Frame rate	FR	50	60	65	Hz

8.2 TTL interface timing (DE mode)

• **Horizontal**

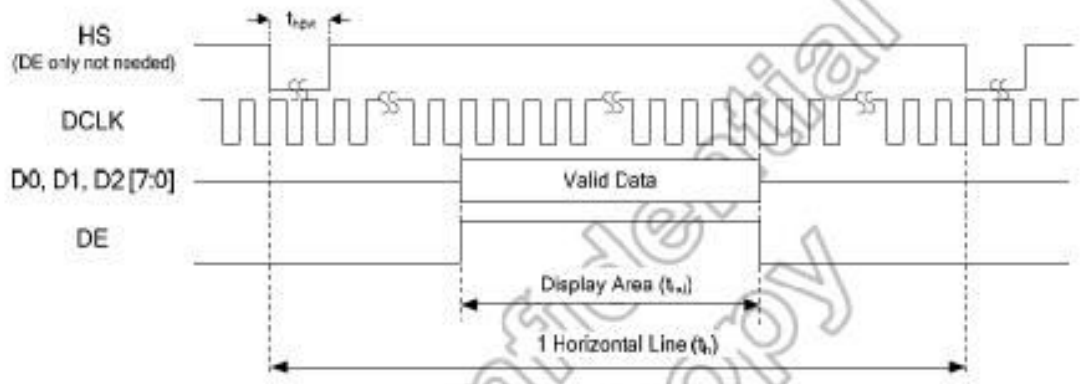


Figure 6.8: Horizontal input timing at DE only mode

• **Vertical**

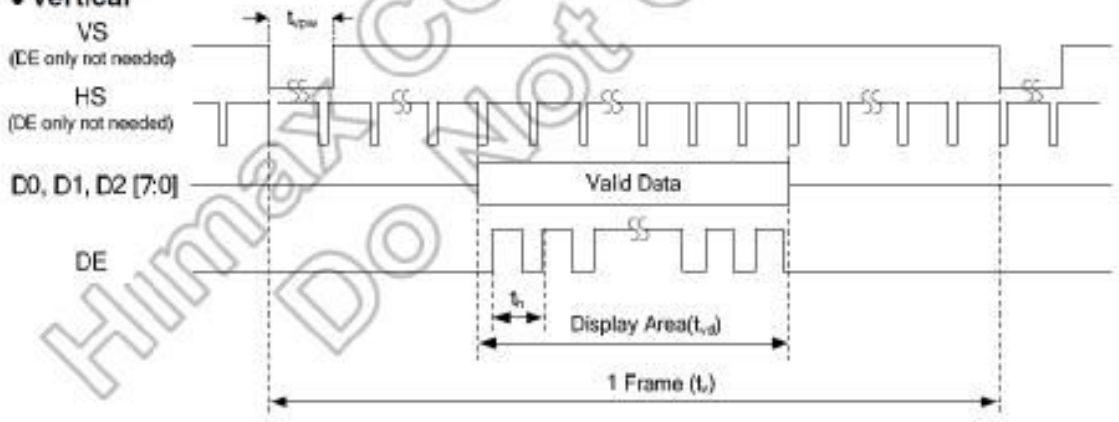
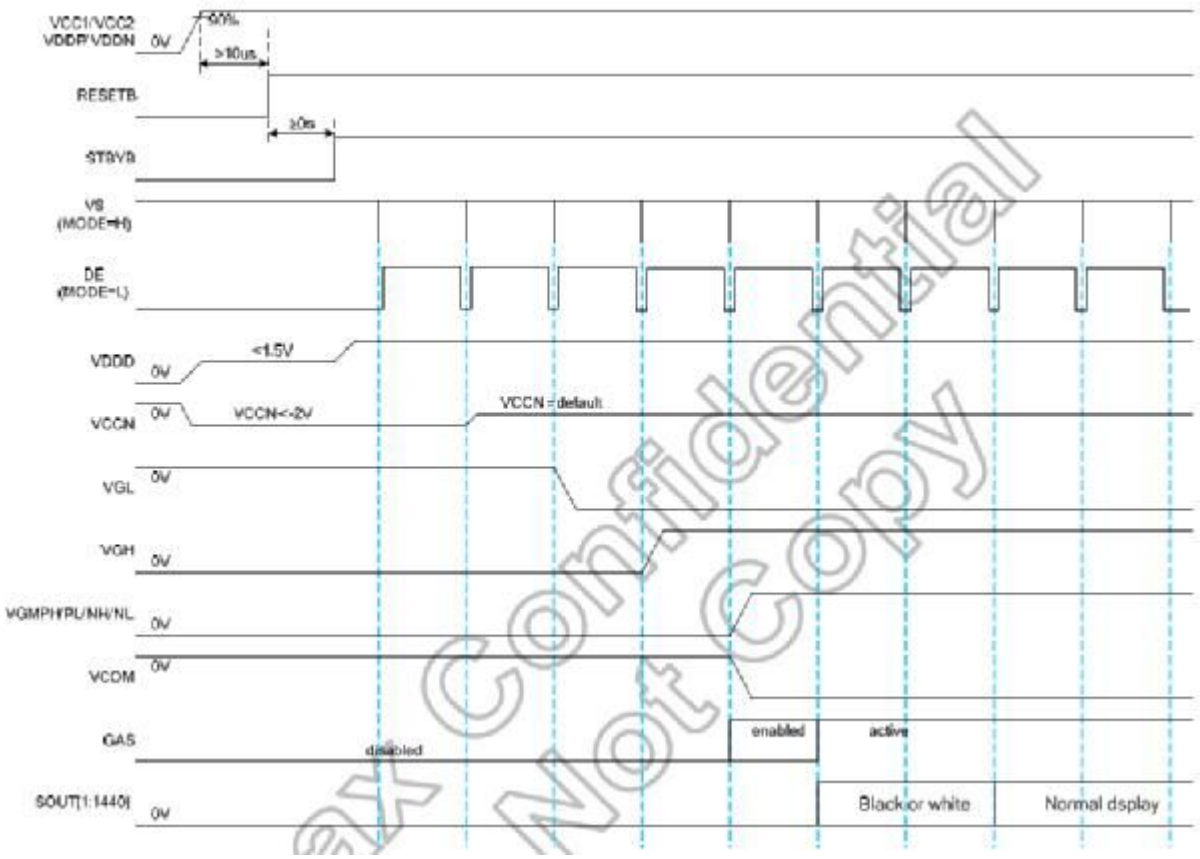


Figure 6.9: Vertical input timing at DE only mode

Parameter	Symbol	800xRGBx480			Unit
		Min.	Typ.	Max.	
DCLK Frequency	F_{DCLK}	-	26.4	-	MHz
Horizontal valid data	t_{hd}		800		DCLK
1 Horizontal Line	t_h	824	832	1120	DCLK
Vertical valid data	t_{vd}		480		H
1 Vertical field	t_v	490	528	576	H
Frame rate	FR	50	60	65	Hz

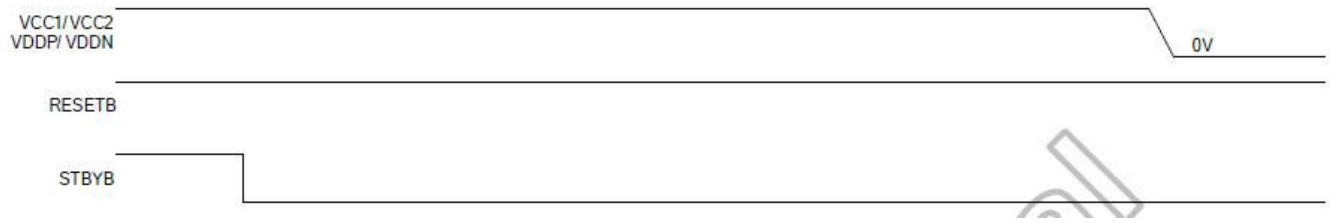
8.3 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS



8.4 Power Sequence

Power on Sequence

Power off Sequence



9. Optical Specification

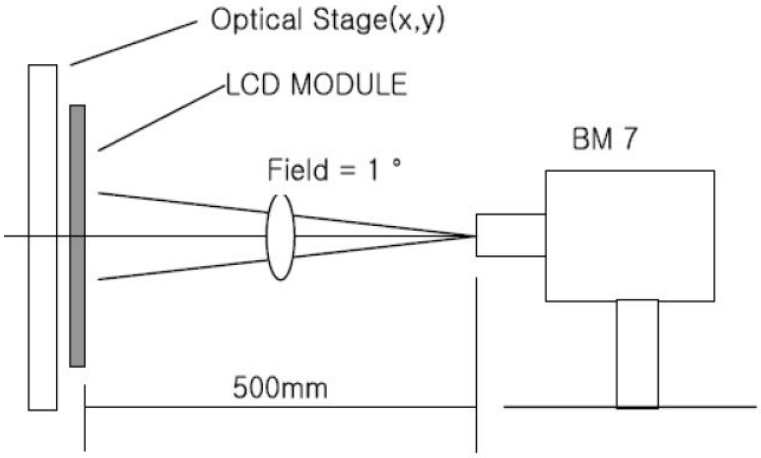
Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=Φ=0°	-	900	-		Note1 Note2
Response Time		Ton+Toff	25℃	-	40	-	ms	Note1 Note3
View Angles		θT	CR≧10	70	85	-	Degree	Note 4
		θB		70	85	-		
		θL		70	85	-		
		θR		70	85	-		
Chromaticity	White	x	Brightness is on	TBD	TBD	TBD		Note5, Note1
		y		TBD	TBD	TBD		
Luminance		L		-	800	-	cd/m²	Note1 Note6
Uniformity		U		80	-	-	%	Note1 Note7
NTSC		-	Θ= 0°	-	70	-	%	
Threshold Voltage		Vsat		4.1	4.3	4.5	V	Note8
		Vth		1.6	1.8	2.0	V	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃)

LED back-light: ON, Environment brightness < 150 lx

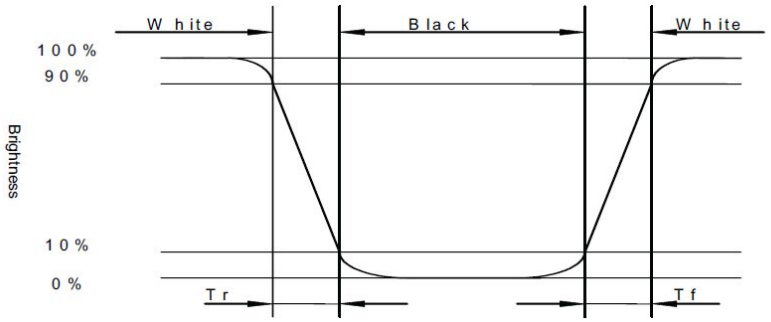


Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

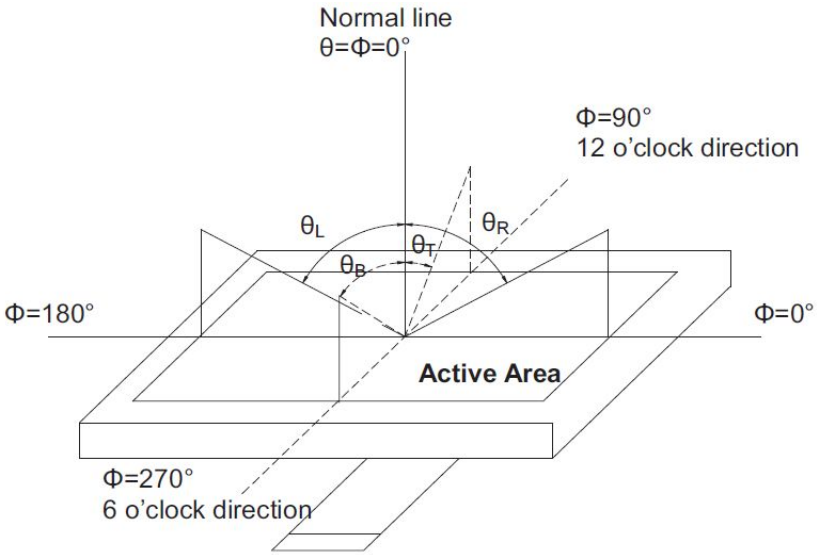
Note 3: Response time is defined as follow:

Response time is the time required for the display to transition from black to white (Rise Time, Tr) and from white to black(Decay Time, Tf).



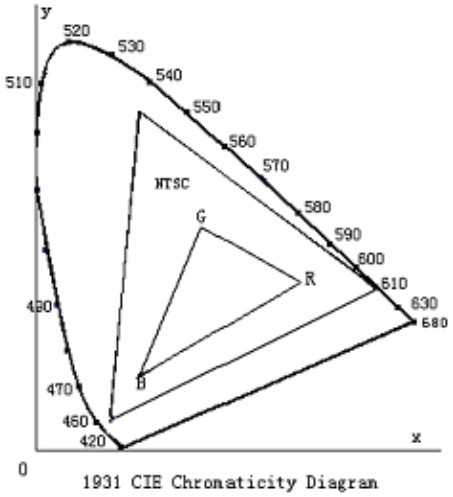
Note 4: Viewing angle range is defined as follow:

Viewing angle is measured at the center point of the LCD.



Note 5: Color chromaticity is defined as follow: (CIE1931)

Color coordinates measured at center point of LCD.



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

Note 6: Luminance is defined as follow:

Luminance is defined as the brightness of all pixels “White” at the center of display area on optimum contrast.

Note 7: Luminance Uniformity is defined as follow:

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Uniformity (U)} = \frac{\text{Minimum Luminance(brightness) in 9 points}}{\text{Maximum Luminance(brightness) in 9 points}}$$

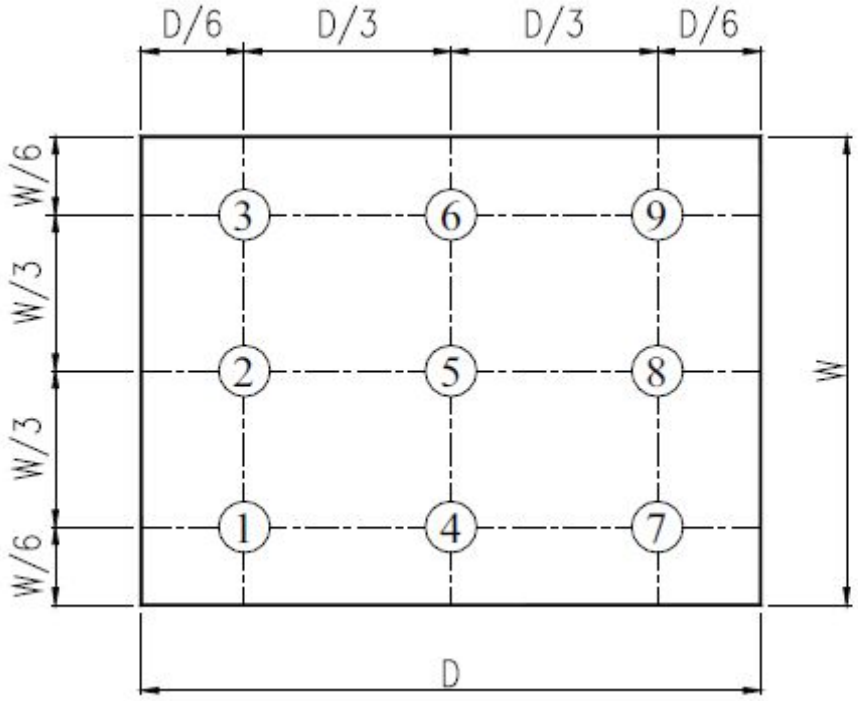
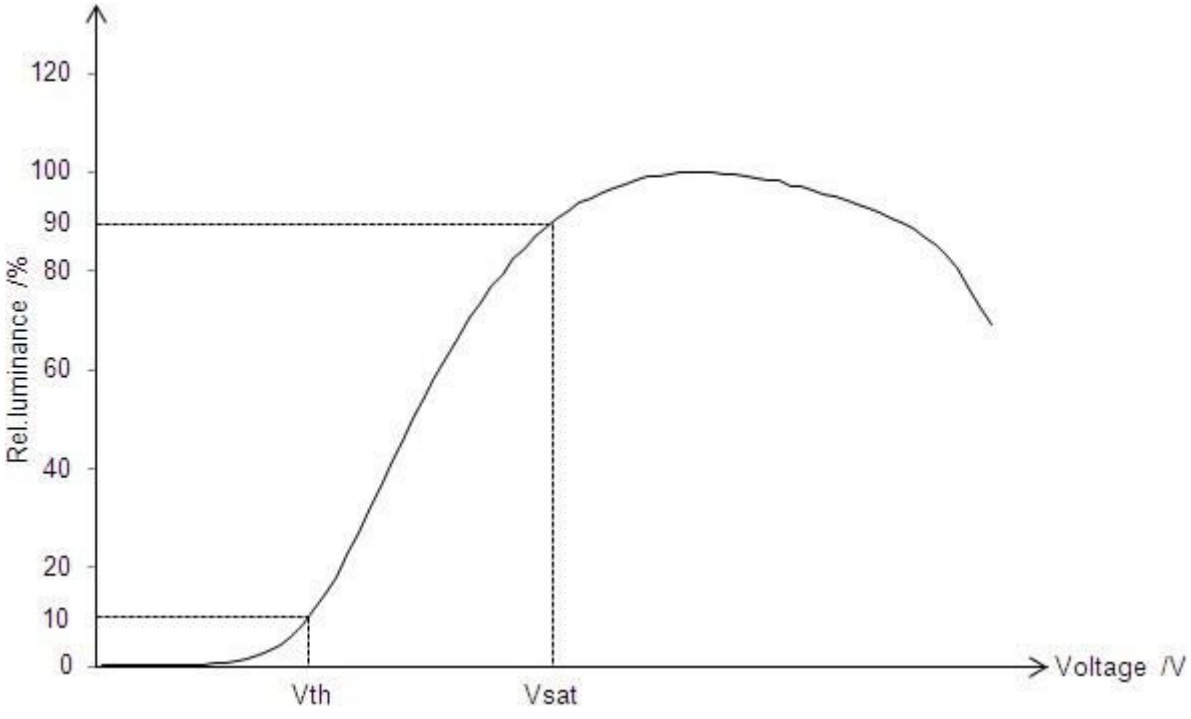


Fig. 2 Definition of uniformity

Note 8: The definition of Vth & Vsat



10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+85℃, 120hrs	Per table in below
2	Low Temp Operation	Ta=-30℃, 120hrs	Per table in below
3	High Temp Storage	Ta=+90℃, 120hrs	Per table in below
4	Low Temp Storage	Ta=-40℃, 120hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+40℃, 90% RH max 120 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30℃ 30 min~+85℃ 30 min, Change time:5min, 100 Cycles	Per table in below
7	ESD (Operation)	± 2KV, Human Body Mode, 100pF/1500Ω	Per table in below
8	Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.	Per table in below
9	Shock (Non-operation)	100G 6ms, ±X,±Y,±Z 3times, for each direction	Per table in below
10	Package Drop Test	Height:60 cm, 1 corner, 3 edges, 6 surfaces	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the LCD Panel
Alignment of LCD Panel	No Bubbles in the LCD Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display

11. Precautions for Use of LCD Modules

11.1 Safety

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

11.2 Handling

A. The LCD and touch panel is made of plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
B. Do not handle the product by holding the flexible pattern portion in order to assure the reliability
C. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.
D. Provide a space so that the panel does not come into contact with other components.
E. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.
F. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.
G. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.
H. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

11.3 Static Electricity

A. Ground soldering iron tips, tools and testers when they are in operation.
B. Ground your body when handling the products.
C. Power on the LCD module before applying the voltage to the input terminals.
D. Do not apply voltage which exceeds the absolute maximum rating.
E. Store the products in an anti-electrostatic bag or container.

11.4Storage

A. Store the products in a dark place at +25℃±10℃ with low humidity (40% RH to 60% RH). Don't expose to sunlight or fluorescent light.
B. Storage in a clean environment, free from dust, active gas, and solvent.

11.5 Cleaning

A. Do not wipe the touch panel with dry cloth, as it may cause scratch.
B. Wipe off the stain on the product by using soft cloth moistened with ethanol. Do not allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. Do not use any organic solvent or detergent other than ethanol.

11.6 Cautions for installing and assembling

Bezel edge must be positioned in the area between the Active area and View area. The bezel may press the touch screen and cause activation if the edge touches the active area. A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2 to 0.3mm for the outside dimensions of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.