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DLC Display Co., Limited

德爾西顯示器有限公司



MODEL No:DLC1210BBG-2

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Record of Revision

Date	Revision No.	Summary
2015 10 04	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC1210BBG-2 active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 12.1" display area contains 800(RGB) x600 pixels.

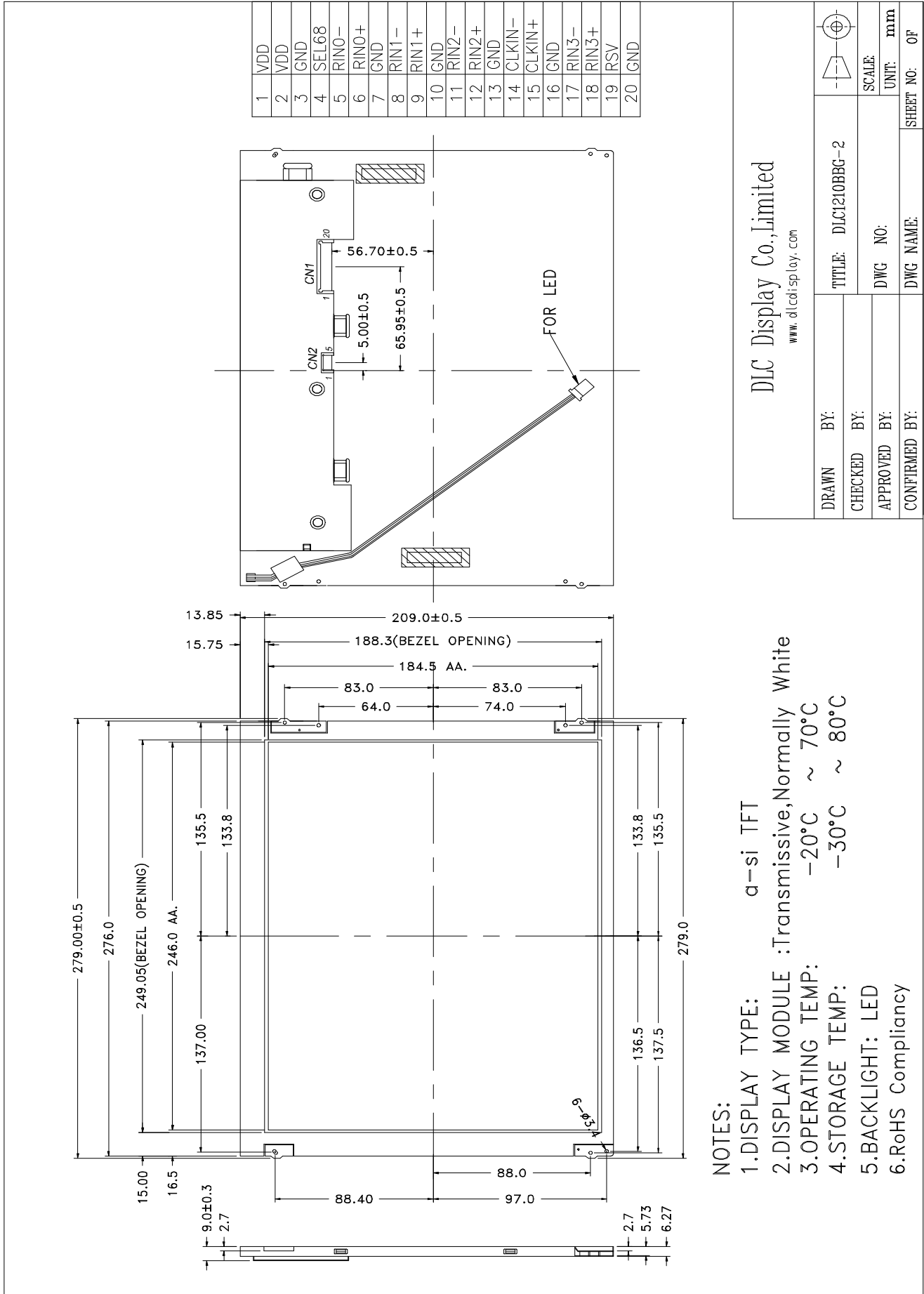
2. Application

Digital equipments which need color display, such as P.O.S, medical equipments and industrial equipments.

3. General Information

Item	Contents	Unit
Size	12.1	inch
Resolution	800(RGB)x600	/
Interface	LVDS	/
Technology type	a-Si TFT	/
Pixel pitch	0.3075x0.3075	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	279.00x209.00x9.0	mm
Active Area	246.00x184.50	mm
Display Mode	Transmissive, Normally white	/
Backlight Type	LED	/
Weight	TBD	g

4. Outline Drawing



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DRAWN BY:	TITLE: DLC1210BBG-2	SCALE:	mm
CHECKED BY:	DWG NO:	UNIT:	mm
APPROVED BY:	DWG NAME:	SHEET NO:	OF
CONFIRMED BY:			

- NOTES:
- 1.DISPLAY TYPE: a-si TFT
 - 2.DISPLAY MODULE :Transmissive,Normally White
 - 3.OPERATING TEMP: -20°C ~ 70°C
 - 4.STORAGE TEMP: -30°C ~ 80°C
 - 5.BACKLIGHT: LED
 - 6.RoHS Compliance

5. Interface signals

Pin	Name	Description
1	VDD	3.3V Power Supply
2	VDD	3.3V Power Supply
3	GND	Ground
4	SEL68	Select 6 or 8 Bits LVDS Input H:8Bits ; L/NC: 6Bits
5	RIN0	LVDS receiver signal channel 0, LVDS differential data input(R0,R1,R2,R3,R4,R5,G0)
6	RIN0+	
7	GND	Ground
8	RIN1	LVDS receiver signal channel 1, LVDS differential data input(G1,G2,G3,G4,G5,B0,B1)
9	RIN1+	
10	GND	Ground
11	RIN2	LVDS receiver signal channel 2, LVDS differential data input(B2,B3,B4,B5,HS,VS,DE)
12	RIN2+	
13	GND	Ground
14	CLKIN	LVDS receiver Signal Clock
15	CLKIN+	
16	GND	Ground
17	RIN3	LVDS receiver signal channel 3, NC for 6Bits LVDS input LVDS differential data input(R6,R7,G6,G7,B6,B7,RSV)
18	RIN3+	
19	RSV	Reverse Scan Function H: Display Reverse; L/NC: Normal Display
20	GND	Ground

Connector: MSB240420-HE or compatible

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

The absolute maximum ratings are list on table as follows. When used out of the absolute maximum ratings, the LSI may be permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the LSI will malfunction and cause poor reliability.

Parameter	Symbol	MIN	MAX	Unit
Power Supply Voltage (LCD Module)	VDD	3.0	3.6	V
Backlight Power Supply Voltage	HVDD	25.2	31.5	V

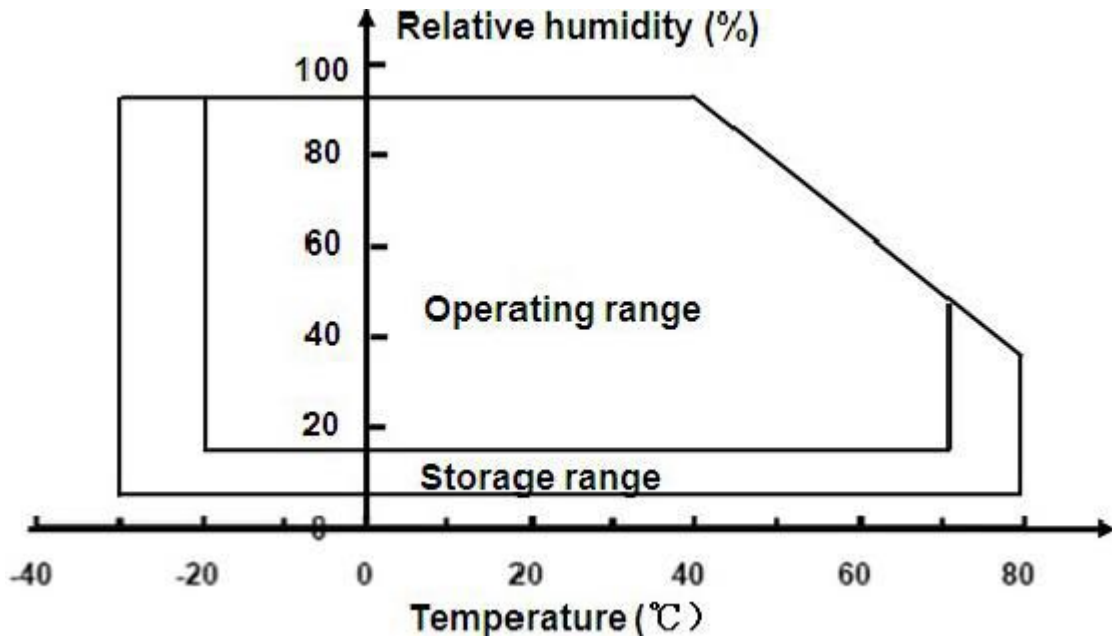
6.2. Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-20	70	°C	
Storage Temperature	TSTG	-30	80	°C	

Note:

Temperature and relative humidity range are shown in the Figure below.

Wet bulb temperature should be 39°C max. and no condensation of water.



7. Electrical Specifications

7.1 Electrical characteristics

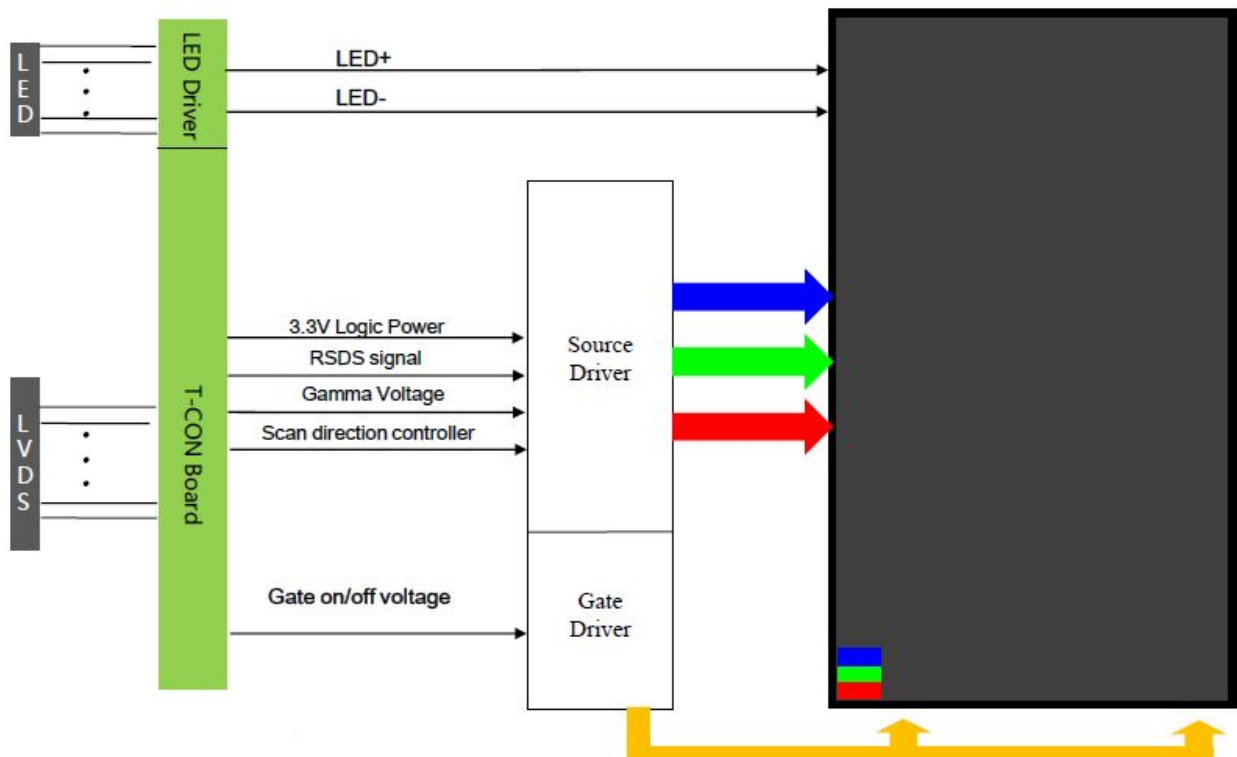
Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Input Voltage	VDD	3.0	3.3	3.6	V	
Power Supply Current	IDD	-	380	-	mA	
Positive-going Input Threshold Voltage	V_{T+}	-	-	+100	mV	
Negative-going Input Threshold Voltage	V_{T-}	-100		-	mV	
Differential input common mode voltage	VCOM	-	4.6	-	V	VIH=100mV VIL=-100mV

7.2 LED Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF		300		mA	
Forward Voltage	VF	27		29	V	
LED Life Time			25,000		hrs	IF=300mA Note

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

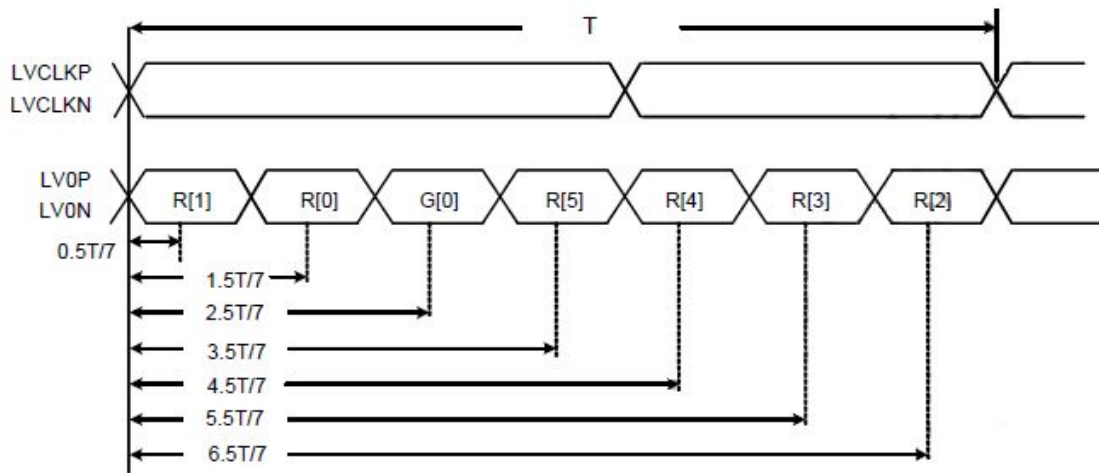
7.3 Block Diagram



8. Command/AC Timing

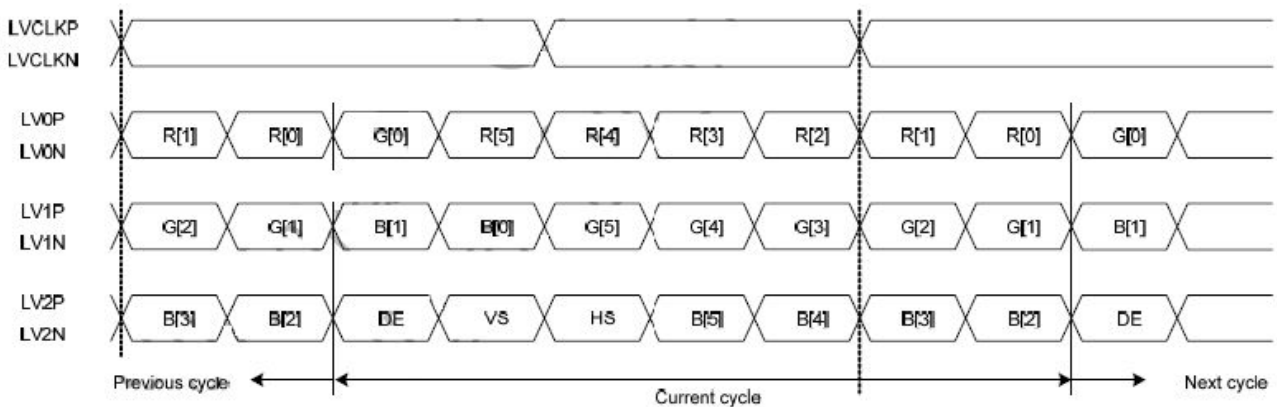
8.1 TIMING CHARACTERISTICS

Ideal strobe position for LVDS input

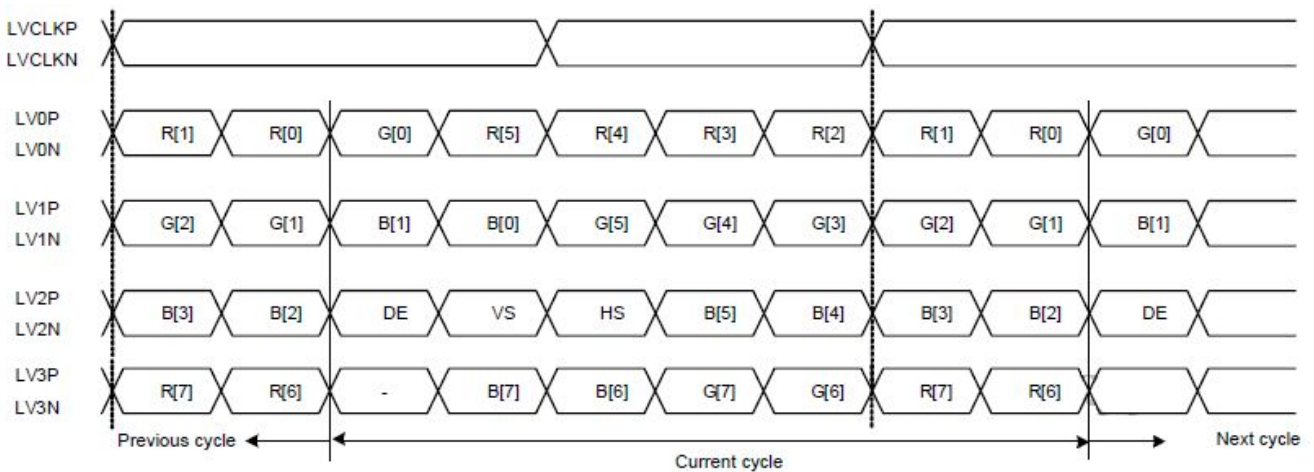


LVDS input data ideal strobe position

LVDS input data mapping



6-bit LVDS input data mapping

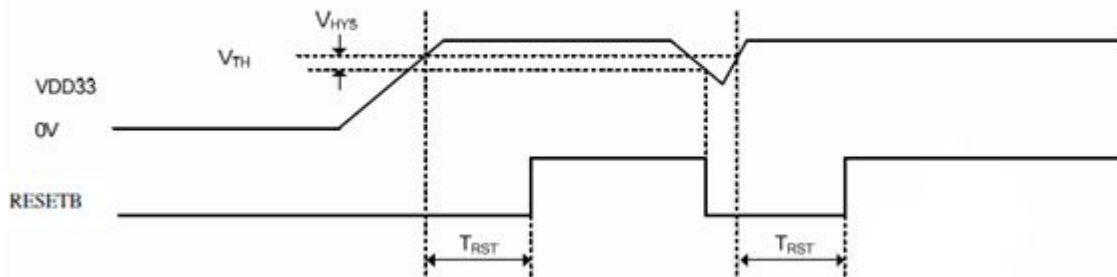


8-bit LVDS input data mapping

Input Timing (DE Mode)

Parameter	Symbol	Condition	SVGA 800X600	Unit
DCLK Frequency	FDCLK	TYP.	40	MHz
Horizontal total timing	TH	Min.	900	TDCLK
		TYP.	1056	TDCLK
		Max.	2047	TDCLK
Horizontal active timing	THA	TYP.	800	TDCLK
Vertical total timing	TV	Min.	604	TH
		TYP.	630	TH
		Max.	1023	TH
Vertical active timing	TVA	TYP.	600	TH

8.2 POWER ON SEQUENCE

Power up sequence


Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Reset threshold voltage	VTH	2	2.1	2.2	V	
Hysteresis voltage	VHYS		200		mV	
Reset duration @R=10KΩ, C=1uF	TBST	10			Ms	

9. Optical Specification

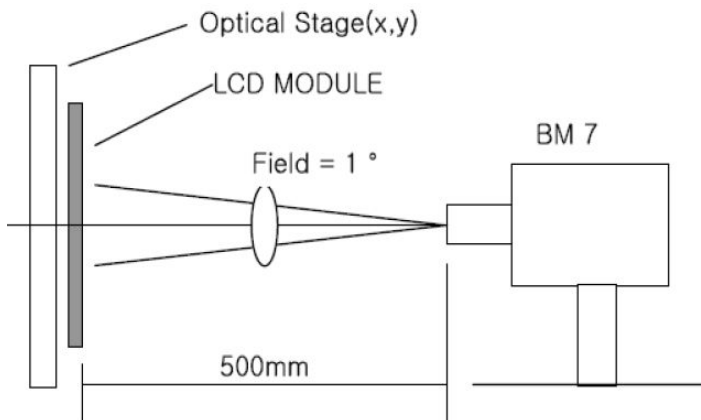
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	600	800			Note1 Note2
Response Time	Tr+Tf	25°C		30		ms	Note1 Note3
View Angles	θT	$CR \geq 10$	55	65		Degree	Note 4
	θB		65	75			
	θL		70	80			
	θR		70	80			
Chromaticity	W	X	Brightness is on	TYP 0.05	TYP+0.05		Note5, Note1
		Y					
	R	X					
		Y					
	G	X					
		Y					
	B	X					
		Y					
NTSC	S			55		%	Note 5
Luminance	L			1000		cd/m ²	Note1 Note6
Uniformity	U		75	80		%	Note1 Note7
NTSC				55		%	

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

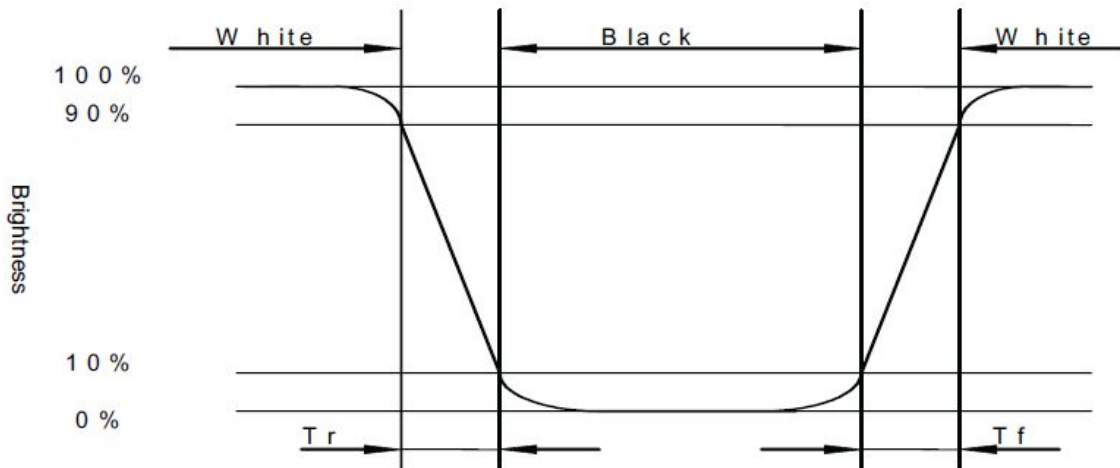


Note 2: Contrast ratio is defined as follow:

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

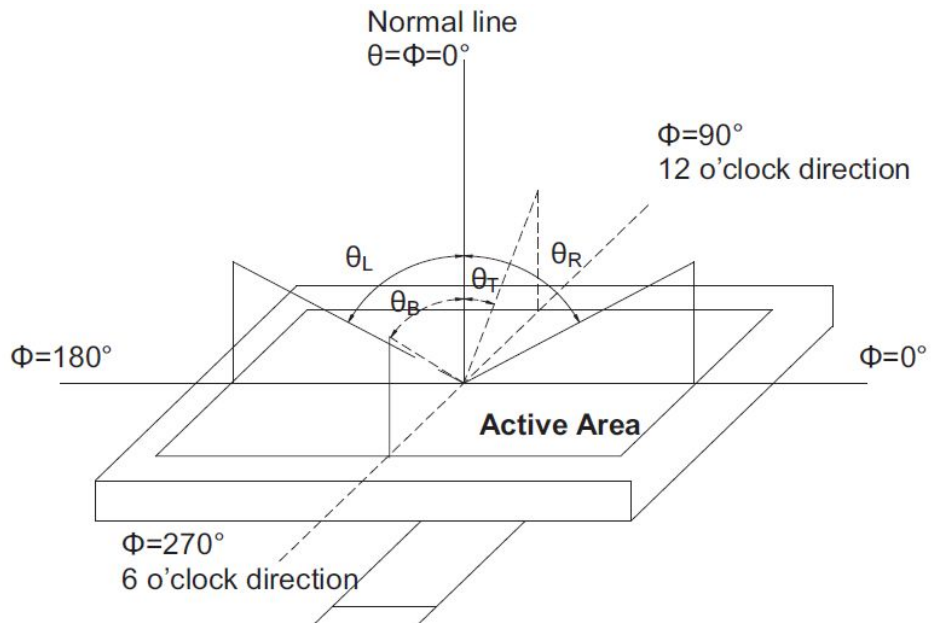
Note 3: Response time is defined as follow:

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



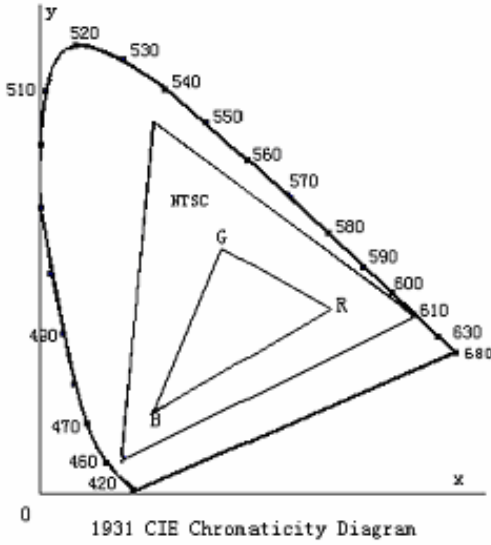
Note 4: Viewing angle range is defined as follow:

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.

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

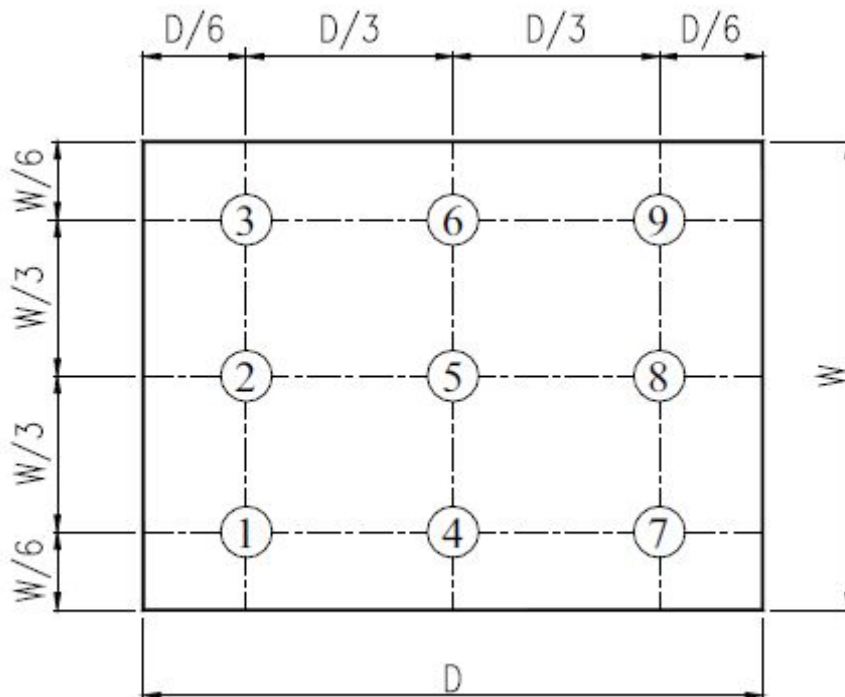


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+80°C, 240hrs	Per table in below
2	Low Temp Operation	Ta= 30°C, 240hrs	Per table in below
3	High Temp Storage	Ta=+70°C, 240hrs	Per table in below
4	Low Temp Storage	Ta= 20°C, 240hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60°C, 90% RH 240 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non operation)	30°C 30 min~+80°C 30 min, Change time:5min, 10 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω ·20points/panel Air:±8KV, 5times; Contact:±6KV, 5 times;	Per table in below
8	Vibration (Non operation)	1.5G,10/500/10,Sine, X/Y/Z Direction	Per table in below
9	Shock (Non operation)	Half sine wave, 300m/s ² , 18ms	Per table in below
10	Package Drop Test	25kPa 16H Restore 2H	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.

11.4 Storage

- A. Store the products in a dark place at $+25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ 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.

