DLC Display Co., Limited

德爾西顯示器有限公司

MODEL No:DLC1210BBG-T-1

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Record of Revision

Date	Revision No.	Summary
2015-07-10	1.0	Rev 1.0 was issued
2018-06-08	2.0	Change the RSV of pin 19 to GND; Modify the TFT connector pin assignment order on the drawing; Modify Absolute Maximum Ratings; Modify Electrical characteristics; Modify Optical specification; Add the driver IC model; Add the viewing direction.

1. Scope

This data sheet is to introduce the specification of DLC1210BBG-T-1 active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC, Capacitive touch panel and a backlight unit. The12.1″ display area contains 800(RGB)x600 pixels.

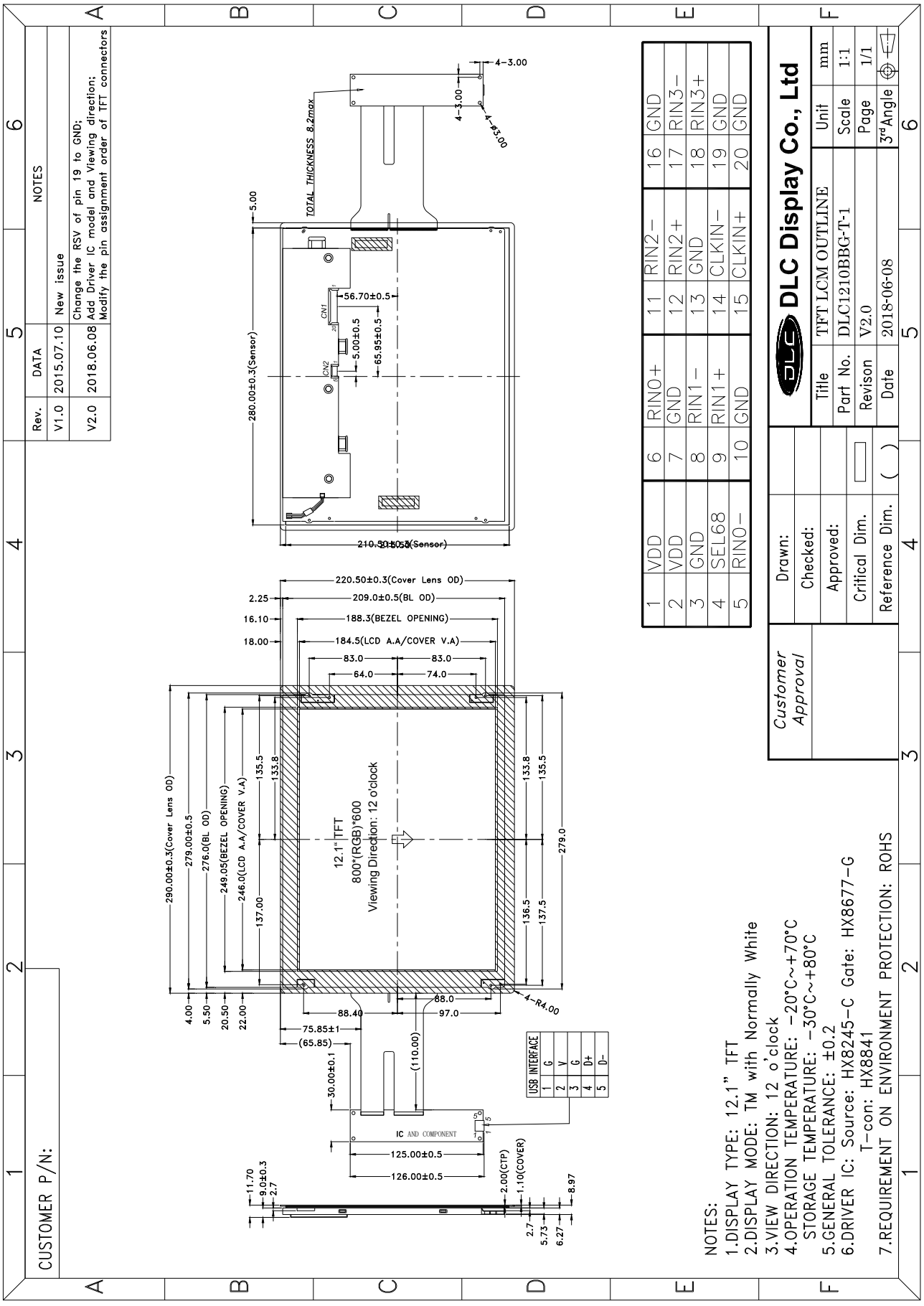
2. Application

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) x 600	/
Interface	LVDS	/
Technology type	a-Si TFT	/
Pixel pitch	0.3075 x 0.3075	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	290.00 x 220.50 x 11.70	mm
Active Area	246.00 x 184.50	mm
Display Mode	Transmissive, Normally white	/
Driver IC	Source: HX8245-C Gate: HX8677-G T-con: HX8841	/
Viewing Direction	12	o'clock
Backlight Type	LED	/

4. Outline Drawing



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 selection [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	GND	Ground
20	GND	Ground

Connector Model Number: MSB240420-HE or compatible

LED backlight:

Pin	Name	Description
1	VCC	Power supply 12V
2	GND	Ground
3	On/Off	5V-On / 0V-Off
4	Dimming	PWM Dimming or Analog Dimming
5	NC	No connection

Connector Model Number: 50277-00501-001 or compatible
Mating Model Number: H208K-P05N-02B or compatible

TP Interface Signal(USB):

Pin	Name	Description
1	G	Power ground
2	V	Power supply
3	G	Power ground
4	D+	USB full speed positive data upstream port
5	D-	USB full speed negative data upstream port

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

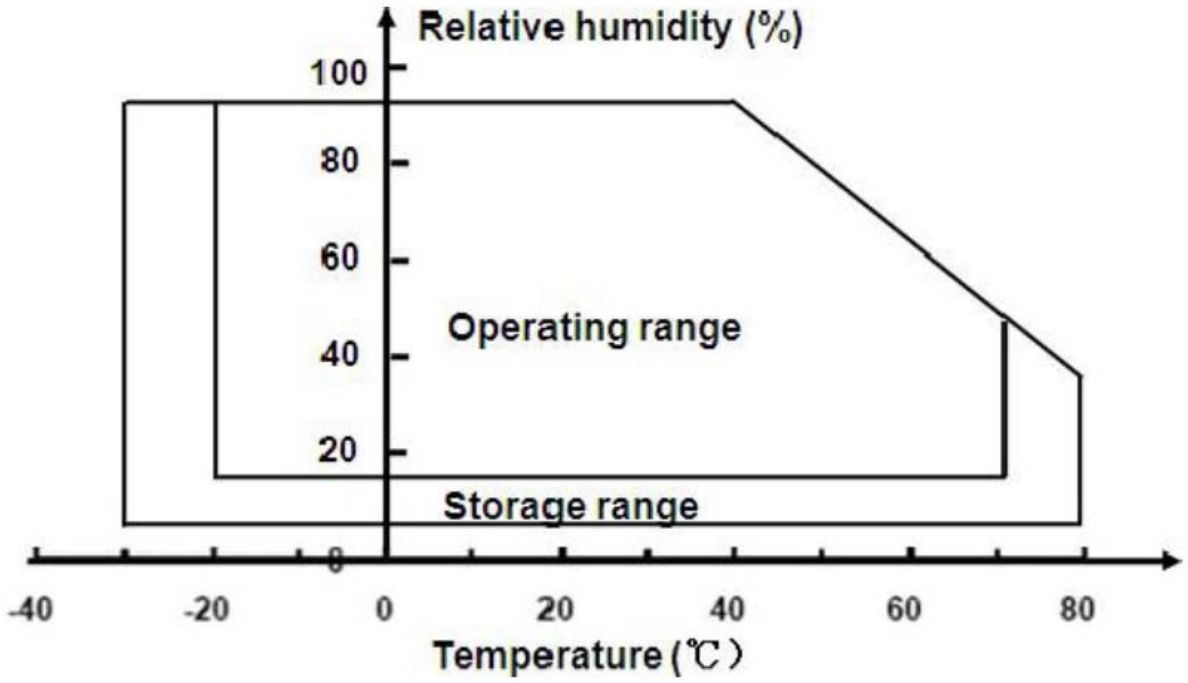
The absolute maximum ratings are list on table as follows. When used out of the absolute maximum ratings, the LSI may be permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions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

Parameter	Symbol	MIN	MAX	Unit	Remark
Power Supply Voltage	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	℃	
Storage Temperature	TSTG	-30	80	℃	

Note: Temperature and relative humidity range are shown in the Figure below.
Wet bulb temperature should be 39℃ 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	VIT+	-	-	+100	mV	
Negative-going input threshold voltage	VIT-	-100	-	-	mV	
Differential input common mode voltage	Vcom	-	4.6	-	V	VIH=100mV VIL=100mV

7.2 LED Backlight

Ta=25℃

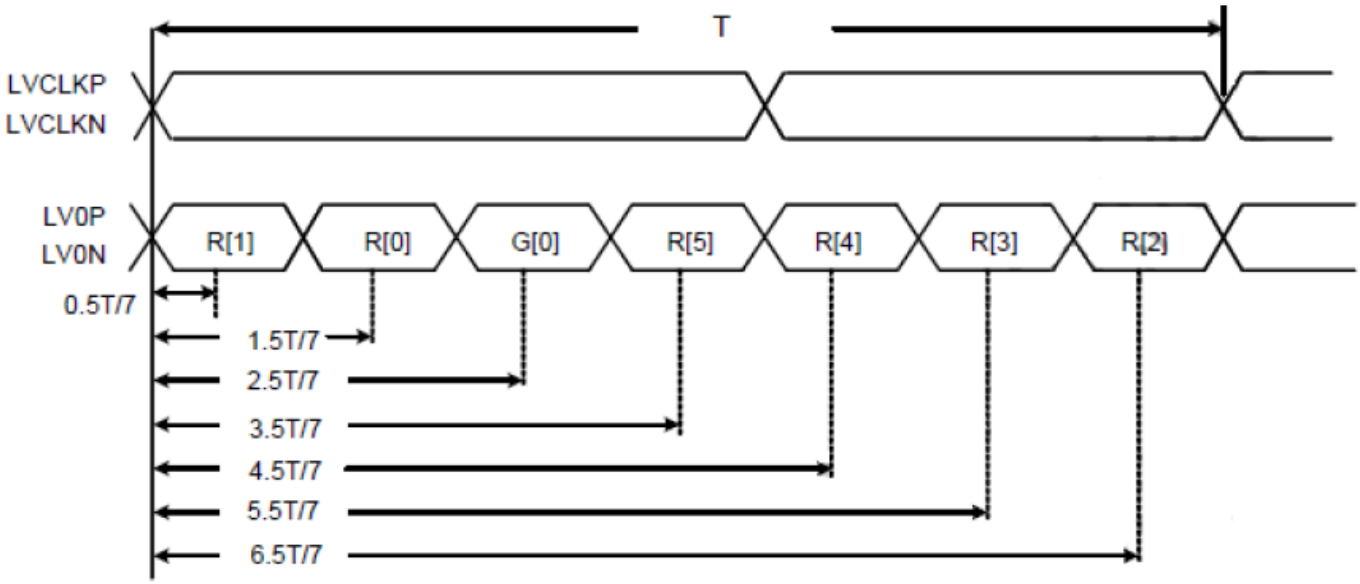
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	160	-	mA	Note1
Forward Voltage	VF	25.2	27.9	31.5	V	
Power Consumption	PBL	4.03	4.47	5.04	W	Note2
	PD	-	1.3	-	W	
	PTotal	-	5.77	-	W	
LED Life Time	-	50,000	-	--	hrs	IF=80mA Note 3

Notes:
1. LED IF=80Ma, 2 Parallel *9 string.
2. Calculator value for reference IFxVF=PLED.
3. The LED Life-time define as the estimated time to 50% degradation of initial luminous.

8. Command/AC Timing

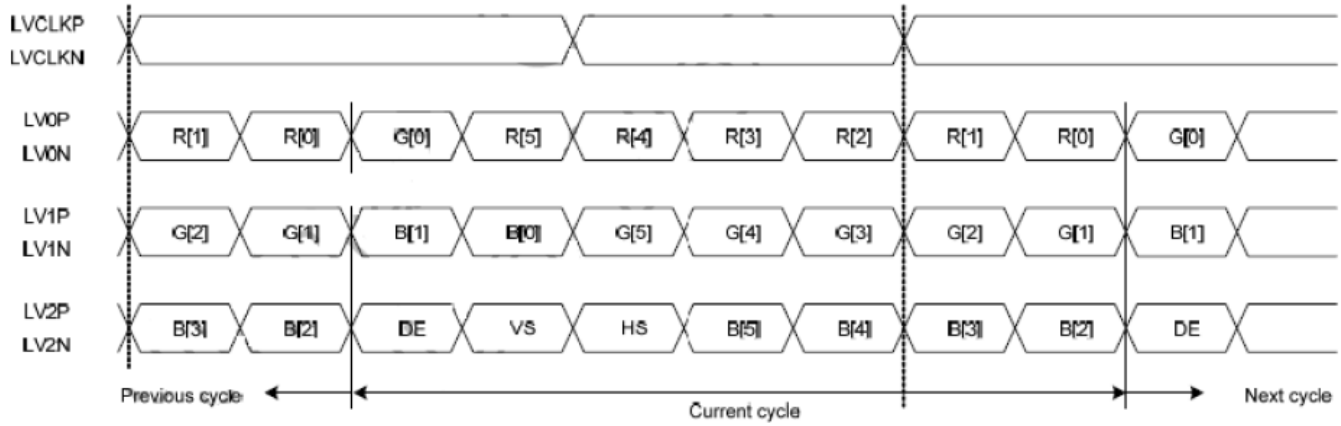
8.1 TIMING CHARACTERISTICS

Ideal strobe position for LVDS input

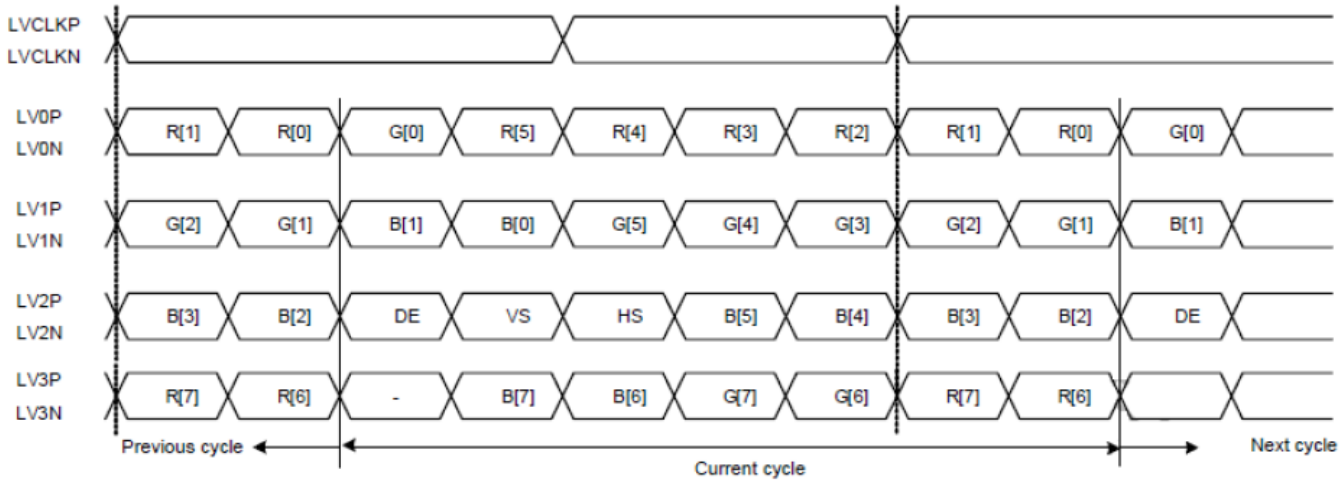


LVDS input data ideal strobe position

LVDS input data mapping



6-bit LVDS input data mapping



8-bit LVDS input data mapping

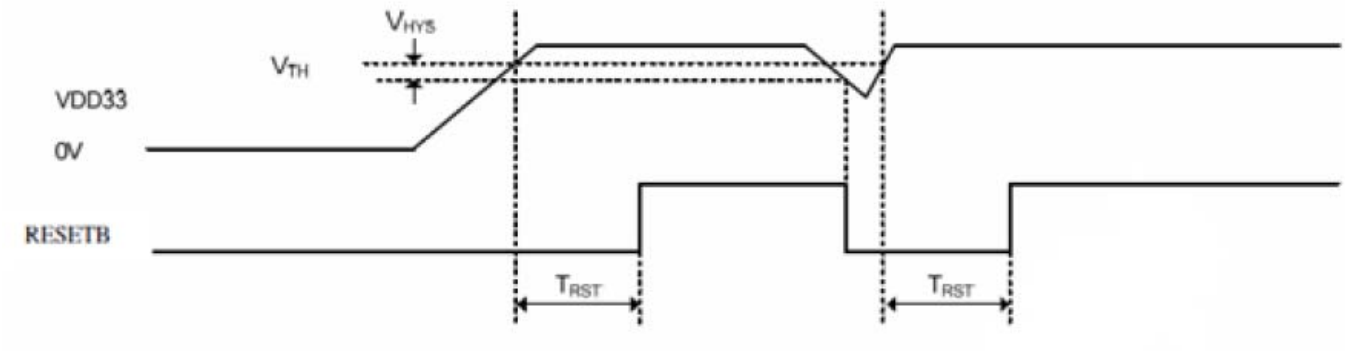
8.2 Input Timing

DE MODE

Parameter	Symbol	SVGA 800x600	Unit	Remark
DCLK Frequency	FDCLK	40	MHz	TYP.
Horizontal total timing	TH	900	TDCLK	Min.
		1056	TDCLK	TYP.
		2047	TDCLK	Max.
Horizontal active timing	THA	800	TDCLK	TYP.
Vertical total timing	TV	604	TH	Min.
		630	TH	TYP.
		1023	TH	Max.
Vertical active timing	TVA	600	TH	TYP.

8.3 POWER ON SEQUENCE

Power ON 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=1μF	TBST	10	-	-	Ms	

9. Optical Specification

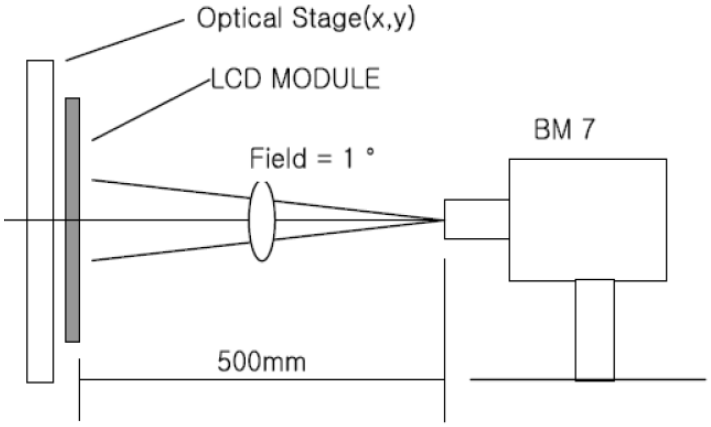
Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	600	800	-		Note1 Note2
Response Time		Ton/ Toff	25℃	-	30	-	ms	Note1 Note3
View Angles		ΘT	CR≧10	55	65	-	Degree	Note 4
		ΘB		65	75	-		
		ΘL		70	80	-		
		θR		70	80	-		
Chromaticity	w	x	Brightness is on	0.263	0.313	0.363		Note5, Note1
		y		0.279	0.329	0.379		
	R	X		0.577	0.627	0.677		
		Y		0.283	0.333	0.383		
	G	X		0.285	0.335	0.385		
		Y		0.519	0.569	0.619		
	B	X		0.101	0.151	0.201		
		Y		0.043	0.093	0.143		
NTSC		S		-	55	-	%	Note 5
Luminance		L		-	390	-	cd/m^2	Note1 Note6
Uniformity		U		75	80	-	%	Note1 Note7
NTSC					55		%	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃)

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

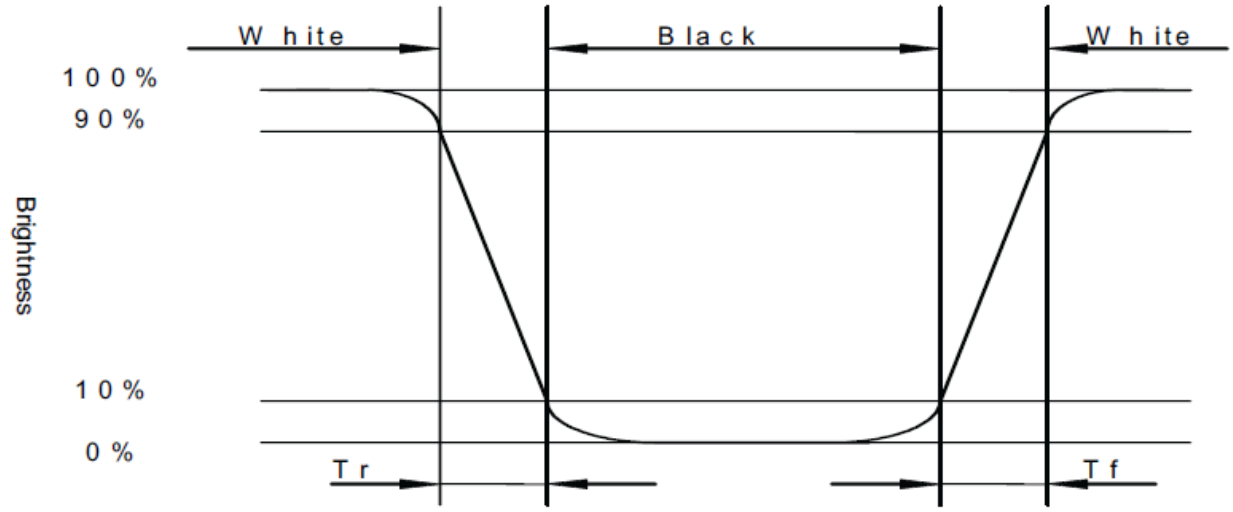


Note 2: Contrast ratio is defined as follow:

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

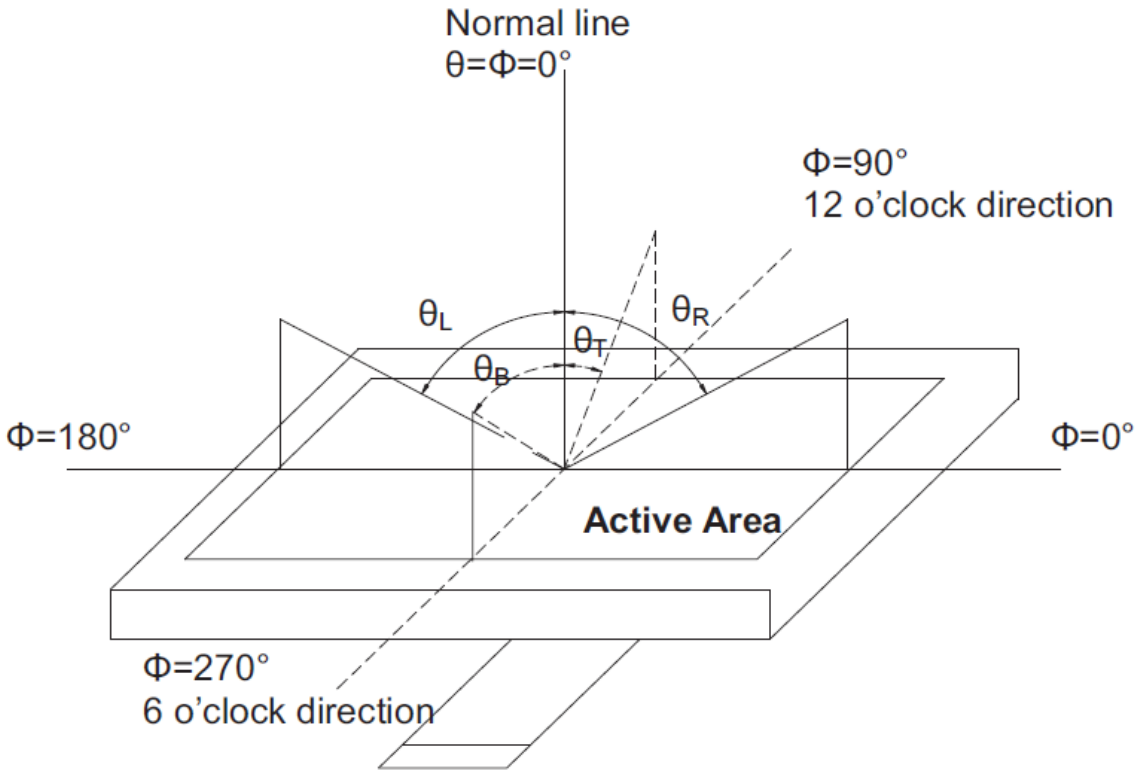
Note 3: Response time is defined as follow:

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).



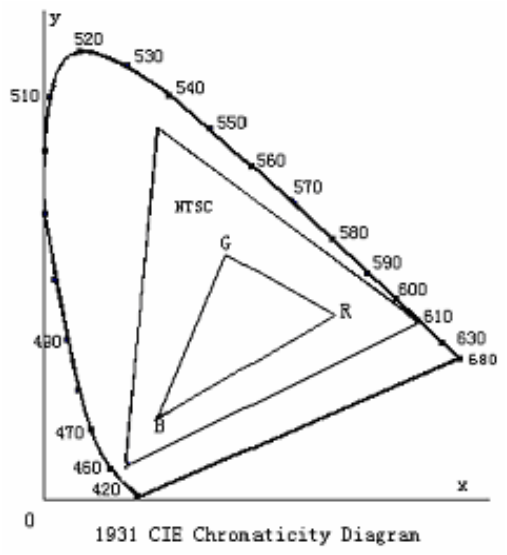
Note 4: Viewing angle range is defined as follow:

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.

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

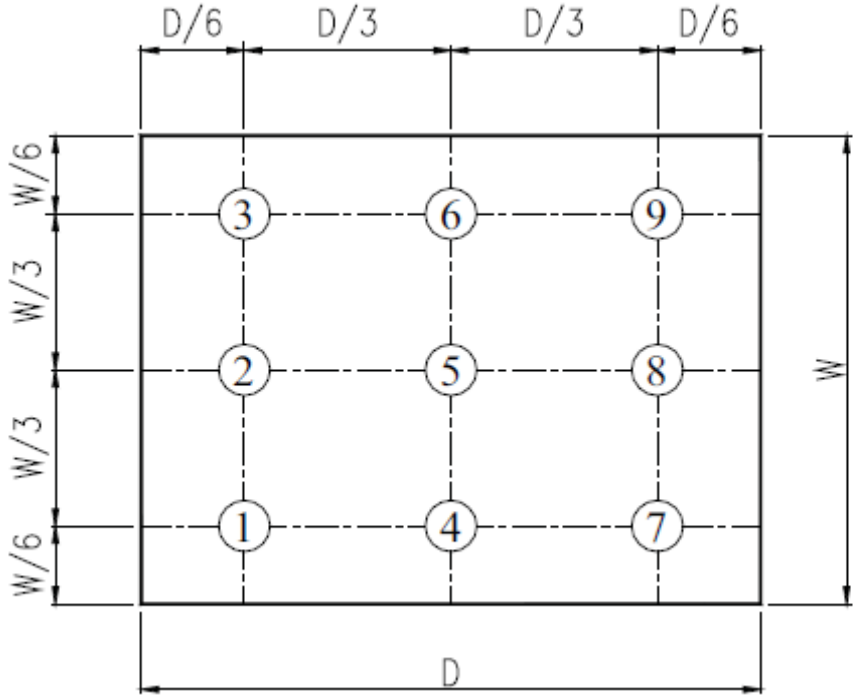


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70℃, 240hrs	Per table in below
2	Low Temp Operation	Ta=-20℃, 240hrs	Per table in below
3	High Temp Storage	Ta=+80℃, 240hrs	Per table in below
4	Low Temp Storage	Ta=-30℃, 240hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60℃, 90% RH 240 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 10 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω，5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times;	Per table in below
8	Vibration (Non-operation)	10Hz~150Hz, 100m/s2, 120min	Per table in below
9	Shock (Non-operation)	Half- sine wave, 300m/s2, 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.

11.4Storage

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

A. 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.
B. In order to make the display assembly stable and firm, DLC recommends to design some supporting at the display backside, especially for the display with tape-attached touch panel, such supporting is important and essential, or else, the display may drop-off from front after some period of time.
C. Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.