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**DLC Display Co., Limited**

德爾西顯示器有限公司



MODEL No: DLC1010AGG-1

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### Record of Revision

Date	Revision No.	Summary
2011-02-18	1.0	Rev 1.0 was issued

### 1. Scope

This data sheet is to introduce the specification of DLC1010AGG-1 active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 10.1'' display area contains 1024(RGB) x 600 pixels.

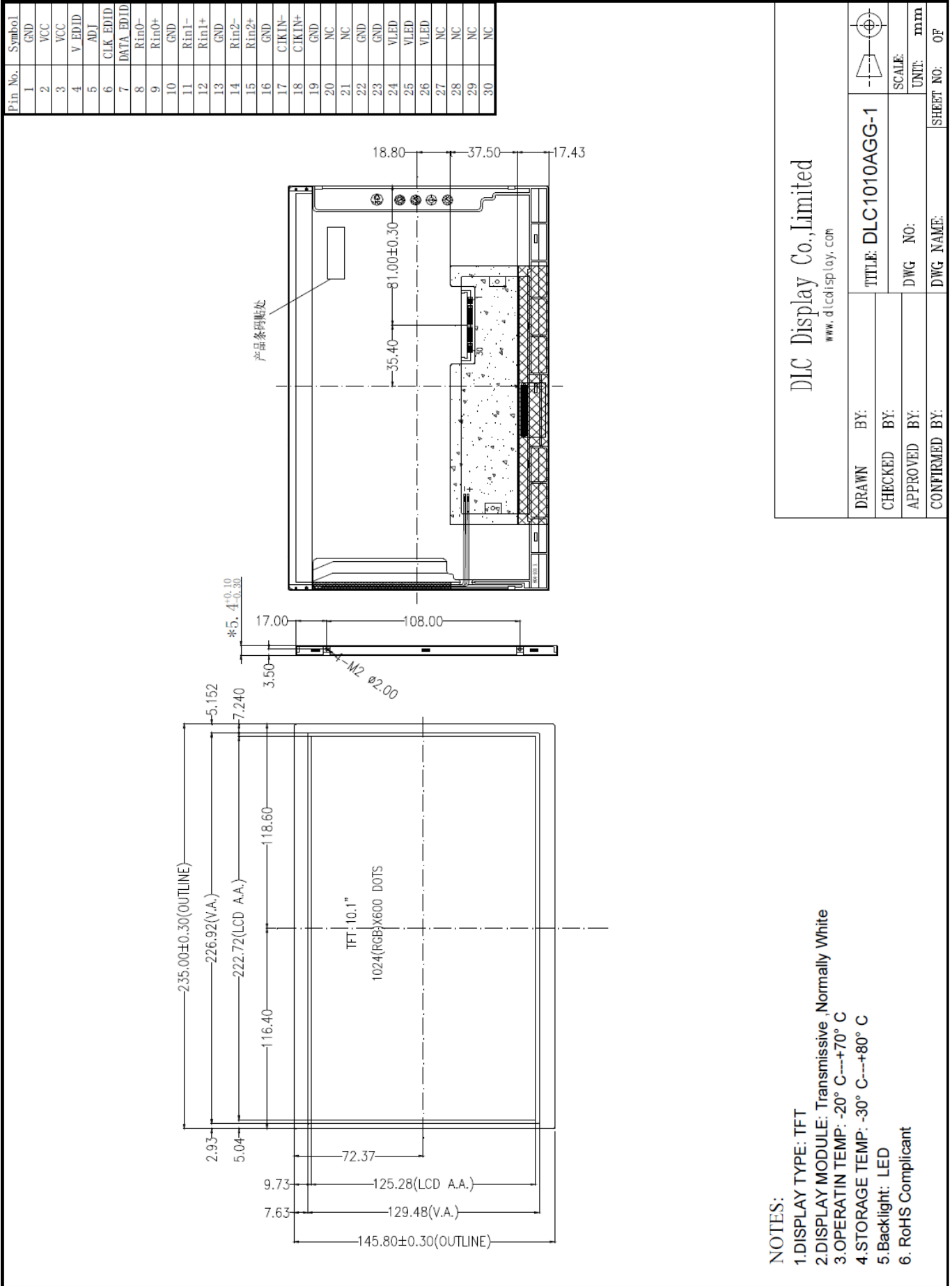
### 2. Application

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

### 3. General Information

Item	Contents	Unit
Size	10.1	inch
Resolution	1024(RGB) x 600	/
Interface	Digital (6bit LVDS)	/
Technology type	a-Si TFT	/
Pixel pitch	0.2175x0.2088	mm
Pixel Configuration	RGB stripes	
Outline Dimension (W x H x D)	235.0x145.8x5.5	mm
Active Area	222.72x 125.28	mm
Display Mode	Normally white, Transmissive	/
Backlight Type	LED	/

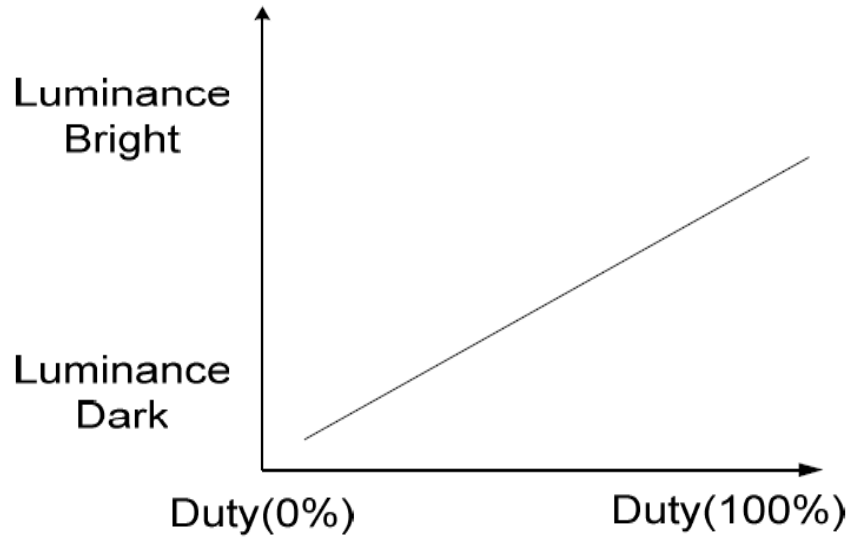
### 4. Outline Drawing



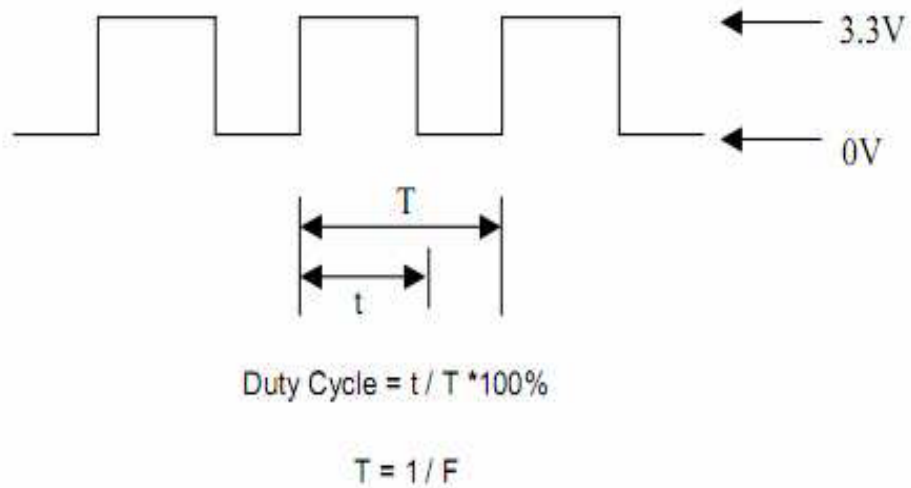
## 5. Interface signals

Pin No.	Symbol	Function
1	GND	Ground
2	VCC	Power Supply, 3.3V(typical)
3	VCC	Power Supply, 3.3V(typical)
4	V_EDID	EDID 3.3V power
5	ADJ	Adjust the Back Light brightness(Notel, 2)
6	CLK_EDID	EDID Clock
7	DATA_EDID	EDID Data
8	Rin0-	- LVDS differential data input (R0-R5, G0)
9	Rin0+	+ LVDS differential data input (R0-R5, G0)
10	GND	Ground
11	Rin1-	- LVDS differential data input (G1-G5, B0-B1)
12	Rin1+	+LVDS differential data input (G1-G5, B0-B1)
13	GND	Ground
14	Rin2-	- LVDS differential data input (B2-B5, HS, VS, DE)
15	Rin2+	+LVDS differential data input (B2-B5, HS, VS, DE)
16	GND	Ground
17	CIKIN-	- LVDS differential clock input
18	CIKIN+	+LVDS differential clock input
19	GND	Ground
20	NC	No Connection(Reserve)
21	NC	No Connection(Reserve)
22	GND	Ground
23	GND	Ground
24	VLED	LED Power Supply 5V
25	VLED	LED Power Supply 5V
26	VLED	LED Power Supply 5V
27	NC	No Connection(Reserve)
28	NC	No Connection(Reserve)
29	NC	No Connection(Reserve)
30	NC	No Connection(Reserve)

Note1: ADJ is used to adjust the B/Lbrightness.



Note 2: ADJ signal=0~3.3V, Operation Frequency:100 Hz~20KHz,



## 6. Absolute maximum Ratings

### 6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	-0.3	4.0	V	
Input Signal Voltage	VI	-0.3	VCC	V	

### 6.2. Environment Conditions

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

### 6.3. LED Backlight Absolute max. ratings

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VLED	-0.3	5.5	V	

## 7. Electrical Specifications

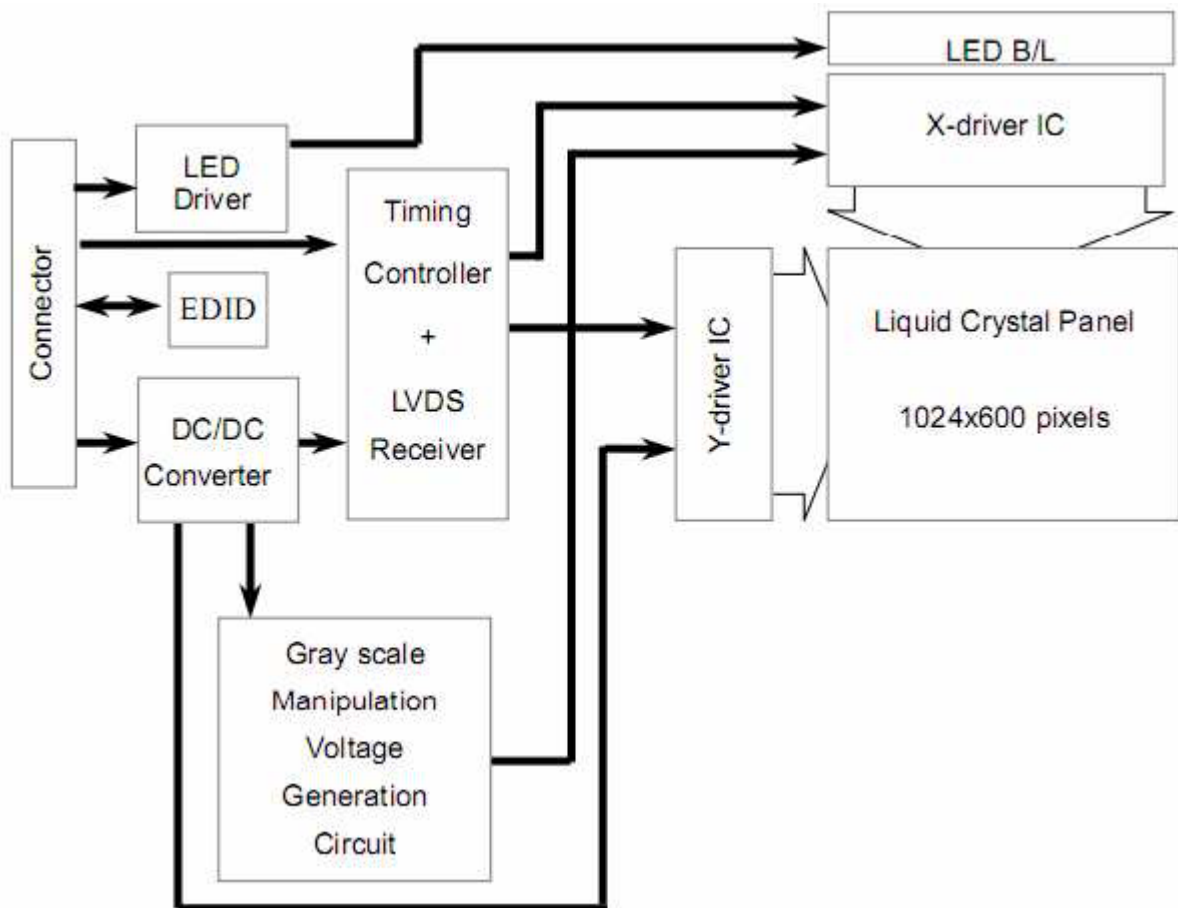
### 7.1 Electrical characteristics

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power Voltage	VCC	3.0	3.3	3.6	V	
Current Consumption	ICC	-	80	-	mA	

### 7.2 LED Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	500	-	mA	
Forward Voltage	VF	4.5	5.0	5.5	V	

### 7.3 Block Diagram





## 8. Command/AC Timing

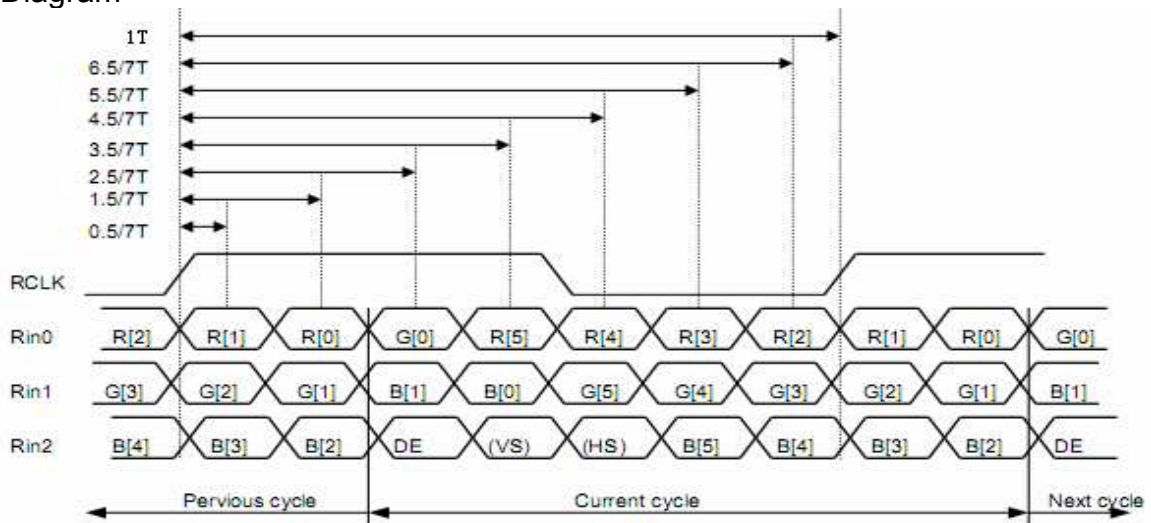
### 8.1 Switching Characteristics

Symbol	Values			Unit	Remark
	Min.	Typ.	Max.		
tRCP	11.76	T	50	ns	Note 1
tRCH		T/2		ns	
tRCL		T/2		ns	
tRCD		3T/7		ns	
tRS	1.9			ns	
tRH	3			ns	
TRIP1	-0.4	0	0.4	ns	Note 2
TRIP0	T/7-0.4	T/7	T/7+0.4	ns	Note 2
TRIP6	2T/7-0.4	2T/7	2T/7+0.4	ns	Note 2
TRIP5	3T/7-0.4	3T/7	3T/7+0.4	ns	Note 2
TRIP4	4T/7-0.4	4T/7	4T/7+0.4	ns	Note 2
TRIP3	5T/7-0.4	5T/7	5T/7+0.4	ns	Note 2
TRIP2	6T/7-0.4	6T/7	6T/7+0.4	ns	Note 2

#### Input Timing (only for DE Mode)

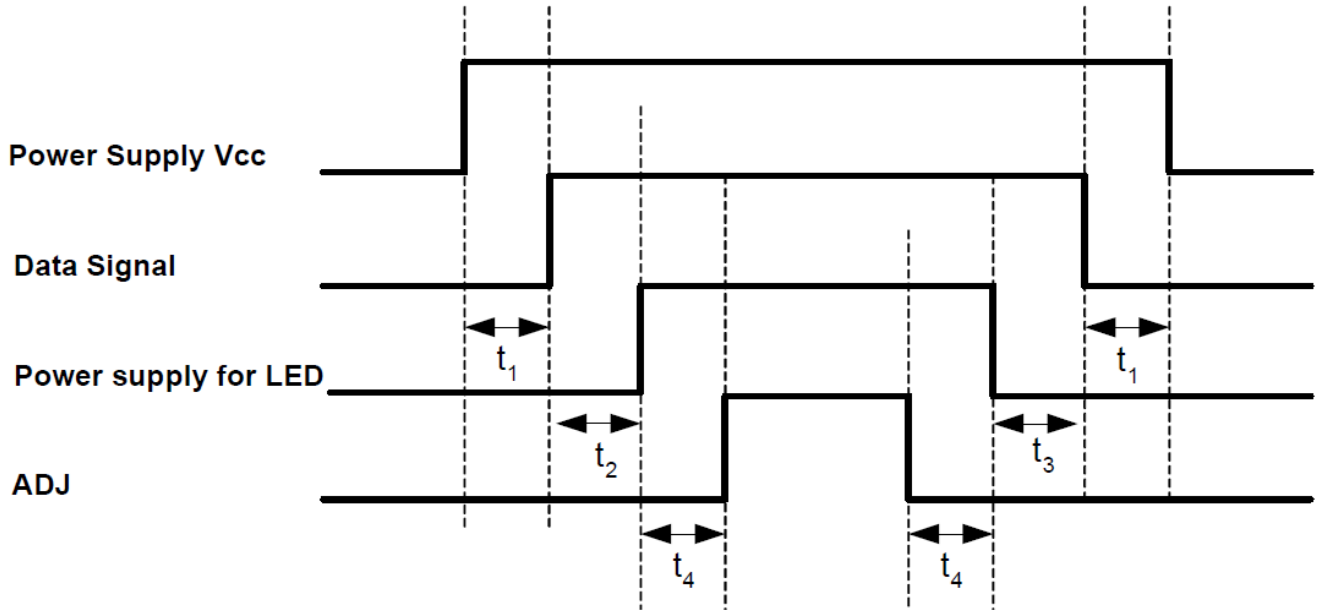
Parameter	Min.	Typ.	Max.	Unit
H-Total	1185	1344	1800	CLK
H-Active	1024	1024	1024	CLK
H-Blanking	161	320	776	CLK
V-Total	628	635	650	LINE
V-Active	600	600	600	LINE
V-Blanking	28	35	50	LINE

#### Timing Diagram



LVDS Receiver Input Timing Definition  
for 6bits LVDS input

8.2 Power Sequence



$$t_1 > 50 \text{ mSec}$$

$$t_2 \cong 200 \text{ mSec}$$

$$t_3 \cong 200 \text{ mSec}$$

$$t_4 \cong 50 \text{ mSec}$$

Note: Data Signal includes Rin0- ~ Rin2-, Rin0+ ~ Rin2+, CLKIN-, CLKIN+.

9. Optical Specification

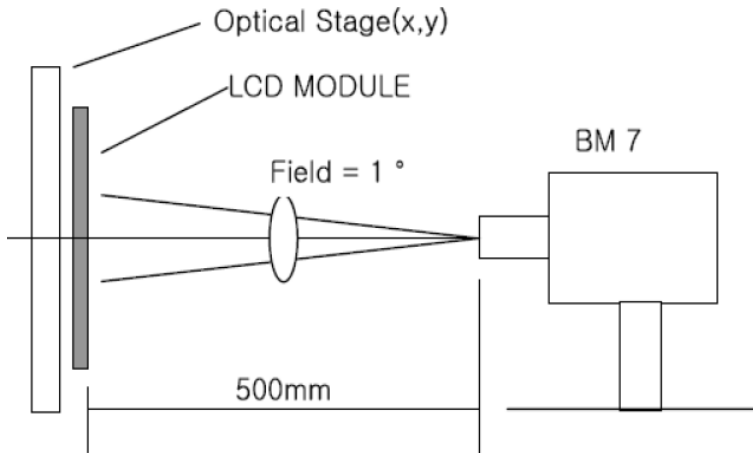
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	400	500	-		Note1 Note2
Response Time	Ton +Toff	25°C	-	16	25	ms	Note1 Note3
View Angles	$\theta T$	CR $\geq$ 10	-	30	-	Degree	Note 4
	$\theta B$		-	50	-		
	$\theta L$		-	60	-		
	$\theta R$		-	60	-		
Chromaticity	White	x	Brightness is on	0.28	0.31	0.35	Note5, Note1
		y		0.29	0.33	0.36	
Luminance	L		-	200	-	cd/m <sup>2</sup>	Note1 Note6
Uniformity	U		70	75	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

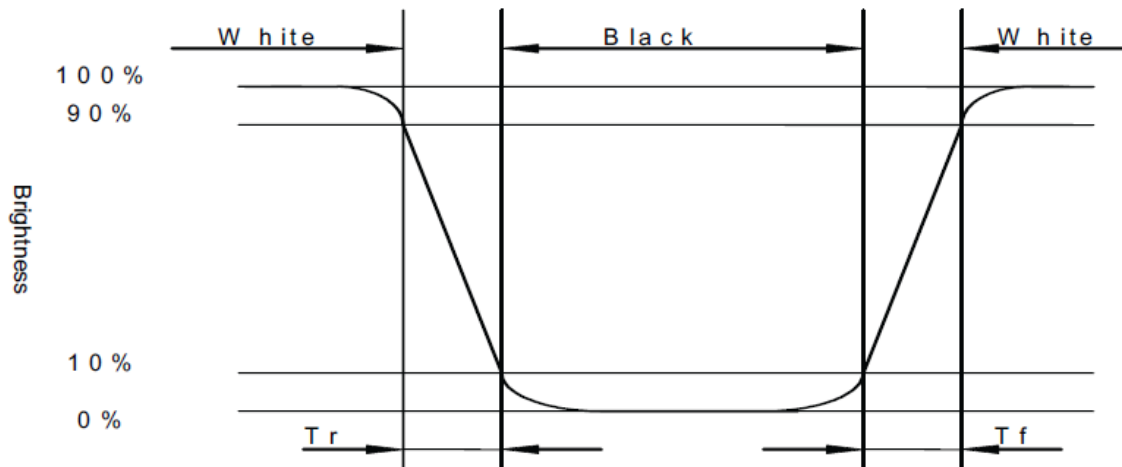


Note 2: Contrast ratio is defined as follow:

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

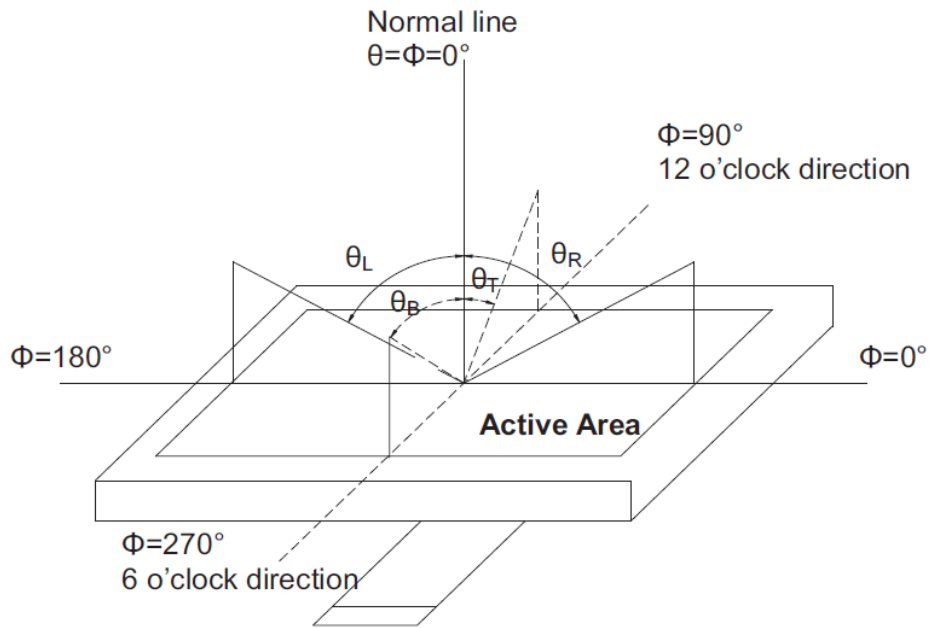
Note 3: Response time is defined as follow:

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



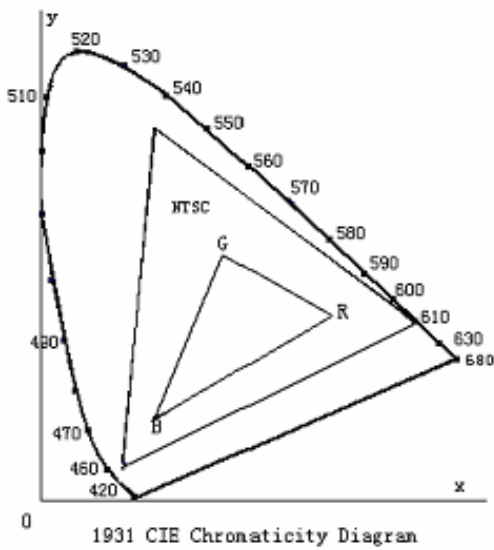
Note 4: Viewing angle range is defined as follow:

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.

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

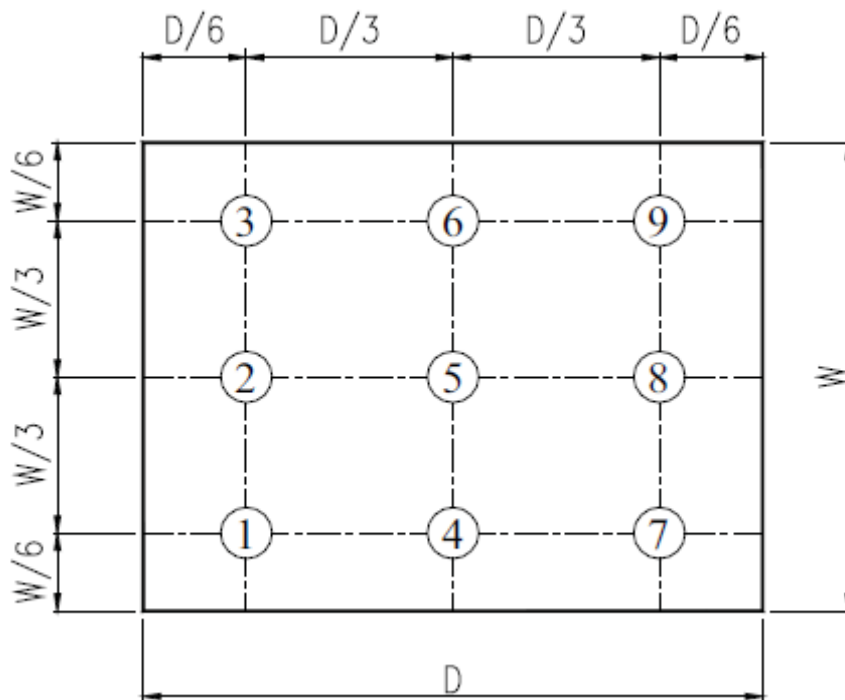


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Operation Temp	Ts=+70°C, 96hrs	Per table in below
2	Low Operation Temp	Ta=-20°C, 96hrs	Per table in below
3	High Temp Storage	Ta=+80°C, 96hrs	Per table in below
4	Low Temp Storage	Ta=-30°C, 96hrs	Per table in below
5	High Temp & High Humidity operating	Ta=+60°C, 90% RH max. 96 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-20°C 60 min~+70°C 60 min, Change time:5min, 100 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω, 5points/panel Air:±8KV, 5times, class B; Contact:±4KV, 5 times, class B;	Per table in below
8	Vibration (Non-operation)	Frequency range:8~33.3Hz, Stroke:1.3mm Sweep:2.9G 33.3Hz~400Hz 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.

### 11.4 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.

