

DLC Display Co., Limited

德爾西顯示器有限公司



MODEL No:DLC0700FDL-T-4

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Record of Revision

Date	Revision No.	Summary
2016-01-22	1.0	Rev 1.0 was issued
2016-04-22	1.1	Change the CTP

1. Scope

This data sheet is to introduce the specification of DLC0700FDL-T-4, active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC, capacitive touch panel and a backlight unit. The 7.0" display area contains 800X3 (RGB) x 480 pixels.

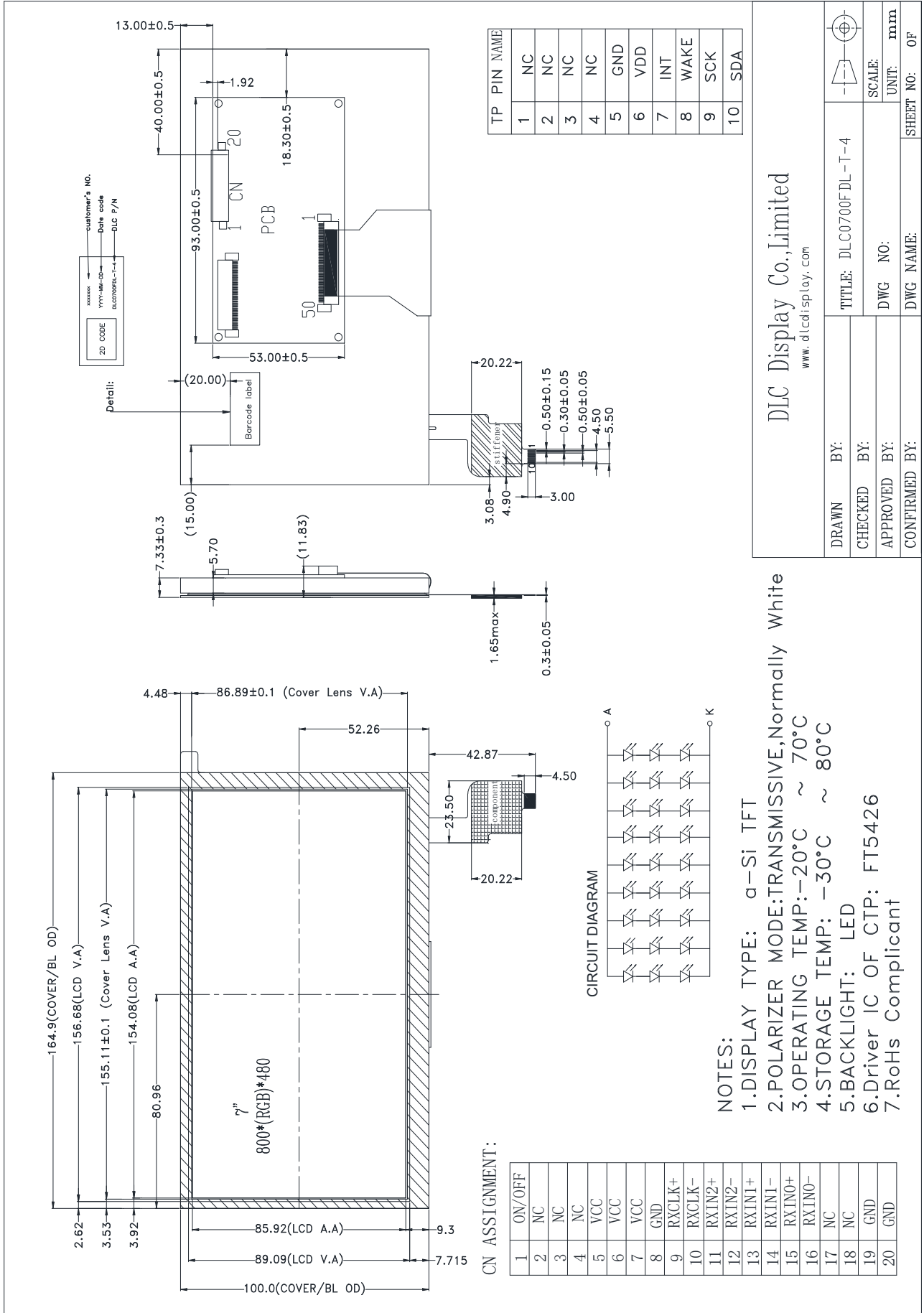
2. Application

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

3. General Information

Item	Contents	Unit
Size	7.0	inch
Resolution	800X3(RGB) x 480	/
Interface	LVDS	/
Technology type	a-Si TFT	/
Pixel pitch	0.1926x0.1790	mm
Pixel Configuration	R.G.B. Stripe	
Outline Dimension (W x H x D)	164.9X100.0X7.33	mm
Active Area	154.08X85.92	mm
Display Mode	Transmissive, Normally white	/
Driver IC of CTP	FT5426	/
Backlight Type	LED	/
Weight	TBD	g

4. Outline Drawing



5. Interface signals

No	Symbol	Description	Remark
1	ON / OFF	Backlight ON/OFF or PWM	PWM 1Khz
2	NC	NC	
3	NC	NC	
4	NC	NC	
5	VCC	+5.0V	
6	VCC	+5.0V	
7	VCC	+5.0V	
8	GND	Power Ground	
9	RXCLK+	Differential Clock Input ((Positive)	
10	RXCLK-	Differential Clock Input Negative)	
11	RXIN2+	Differential Data Input ,CH2 (Positive)	
12	RXIN2-	Differential Data Input ,CH2 (Negative)	
13	RXIN1+	Differential Data Input ,CH1 (Positive)	
14	RXIN1-	Differential Data Input ,CH1 (Negative)	
15	RXIN0+	Differential Data Input ,CH0(Positive)	
16	RXIN0-	Differential Data Input ,CH0(Negative)	
17	NC	NC	
18	NC	NC	
19	GND	Power Ground	
20	GND	Power Ground	

The connector number: A1007WR-S-20P

TP:

PIN	Symbol	Description	Remark
1	NC	No connection	
2	NC	No connection	
3	NC	No connection	
4	NC	No connection	
5	GND	Power ground.	
6	VDD	Power supply	
7	INT	Interrupt output Pin	
8	WAKE	External interrupt from the host	
9	SCK	I2C data signal	
10	SDA	I2C clock signal.	

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power supply voltage	VCC	-0.3	6.0	V	Ta=25° C
Logic input voltage	VI	-0.3	VCC+0.3	V	

6.2. Environment Conditions

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

7. Electrical Specifications

7.1 TFT-LCD display

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply voltage	VCC	+4.5	+5.0	+5.5	V	
Power Supply Current	ICC		220		mA	VCC =5.0V
LED life time	--	-	25,000	--	Hr	Note

Note : The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.

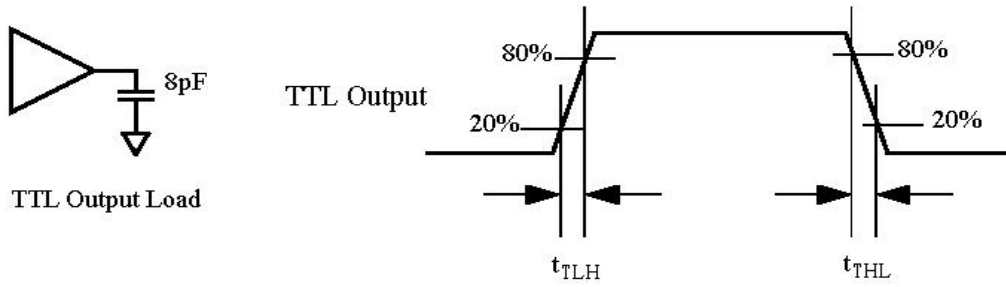
7.2 Capacitive touch panel

7.2.1 Main Feature

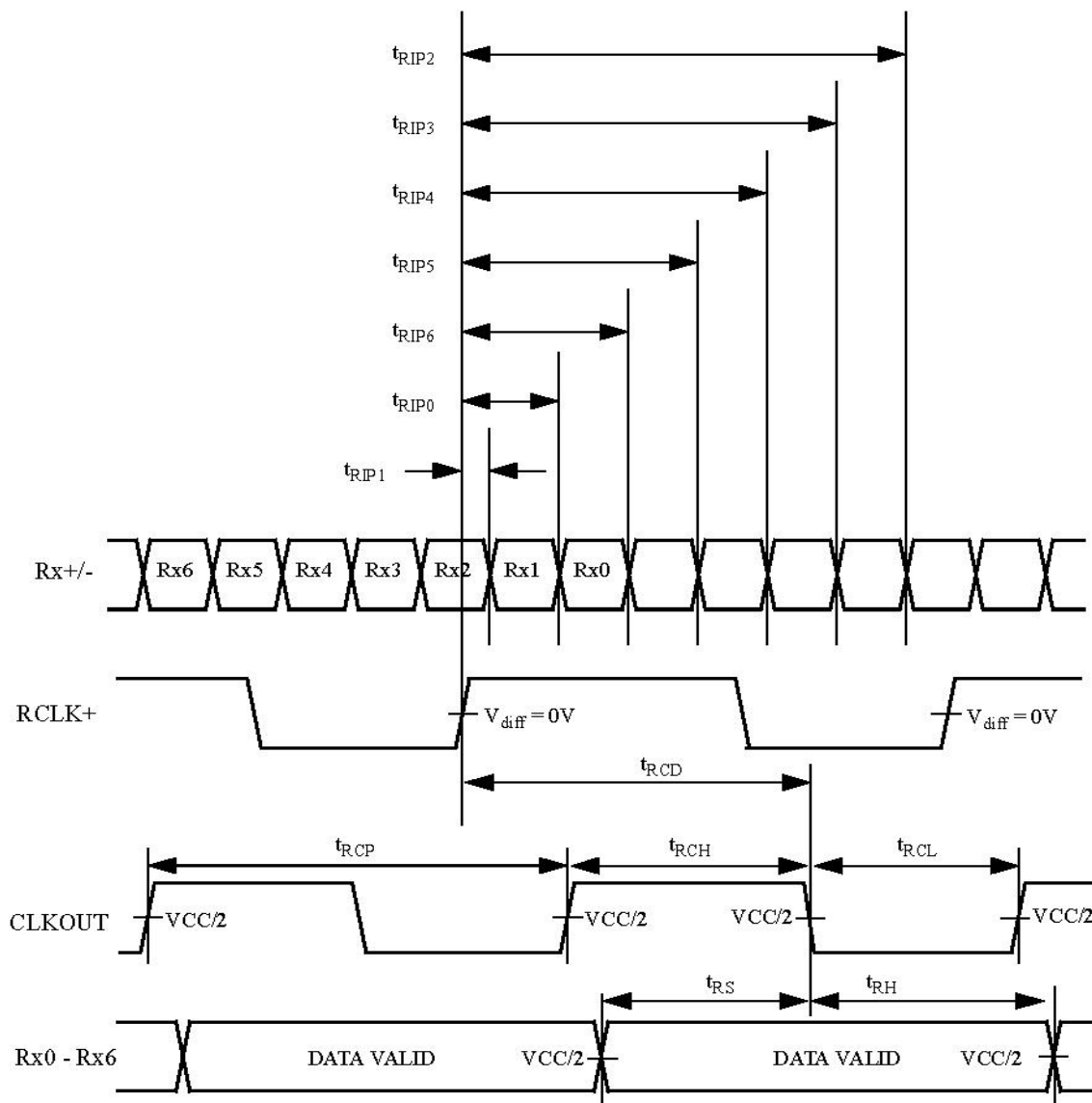
Item	Specification	Unit	Remark
Screen Size	7.0 inch	Diagonal	
Type	Transparent Type Projected Capacitive TP	--	
Input Mode	Human’s Finger	--	
Active Area	155.11 x 86.89	mm	
Outline Size	164.9 x 100	mm	
Interface	I2C	--	
Cover-glass pencil-hardness	7H (min.)	--	
Power Supply voltage VDD	2.8 ~ 3.6	V	
Touch support	5 points (max.)	--	
Touch Controller	FT5426	--	

8. AC Timing

TTL Output



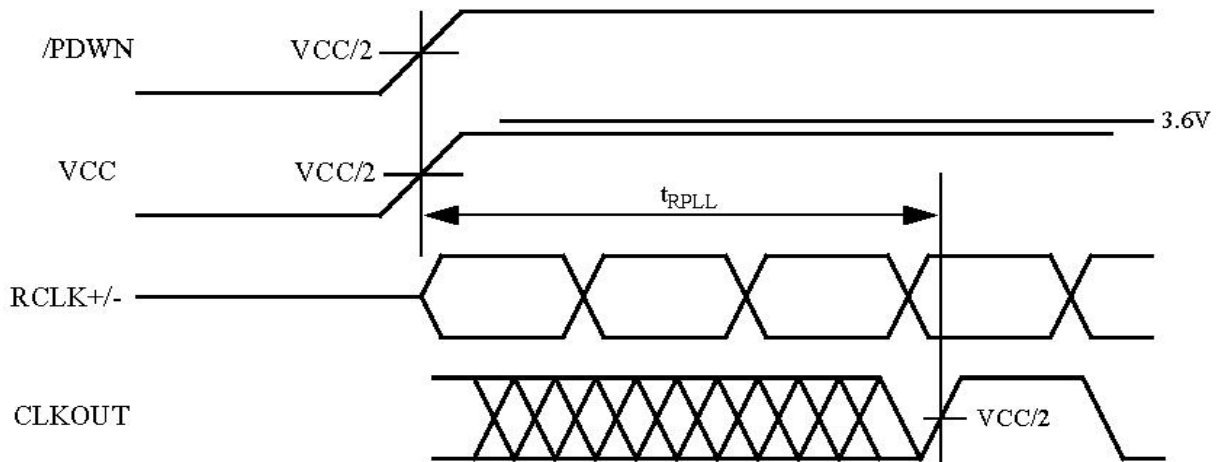
AC Timing Diagrams



Note:

1) $V_{diff} = (RA+) - (RA-), \dots, (RCLK+) - (RCLK-)$

Phase Lock Loop Set Time



Symbol	Parameter		Min.	Typ.	Max.	Units
t_{RCP}	CLK OUT Period	VDD = 3.0 - 3.6V	11.76	T	50.0	ns
		VDD = 2.5 - 3.6V	14.28	T	50.0	ns
t_{RCH}	CLK OUT High Time			4T/7		ns
t_{RCL}	CLK OUT Low Time			3T/7		ns
t_{RCD}	RCLK +/- to CLK OUT Delay			5T/7		ns
t_{RS}	TTL Data Setup to CLK OUT		0.35T-0.3			ns
t_{RH}	TTL Data Hold from CKL OUT		0.45T-1.6			ns
t_{TLH}	TTL Low to High Transition Time			2.0	3.0	ns
t_{THL}	TTL High to Low Transition Time			1.8	3.0	ns
t_{RIP1}	Input Data Position0 (T = 11.76ns)		-0.4	0.0	0.4	ns
t_{RIP0}	Input Data Position1 (T = 11.76ns)		T/7-0.4	T/7	T/7+0.4	ns
t_{RIP6}	Input Data Position2 (T = 11.76ns)		2T/7-0.4	2T/7	2T/7+0.4	ns
t_{RIP5}	Input Data Position3 (T = 11.76ns)		3T/7-0.4	3T/7	3T/7+0.4	ns
t_{RIP4}	Input Data Position4 (T = 11.76ns)		4T/7-0.4	4T/7	4T/7+0.4	ns
t_{RIP3}	Input Data Position5 (T = 11.76ns)		5T/7-0.4	5T/7	5T/7+0.4	ns
t_{RIP2}	Input Data Position6 (T = 11.76ns)		6T/7-0.4	6T/7	6T/7+0.4	ns
t_{RPLL}	Phase Lock Loop Set				10.0	ms

9. Optical Specification

Ta=25°C

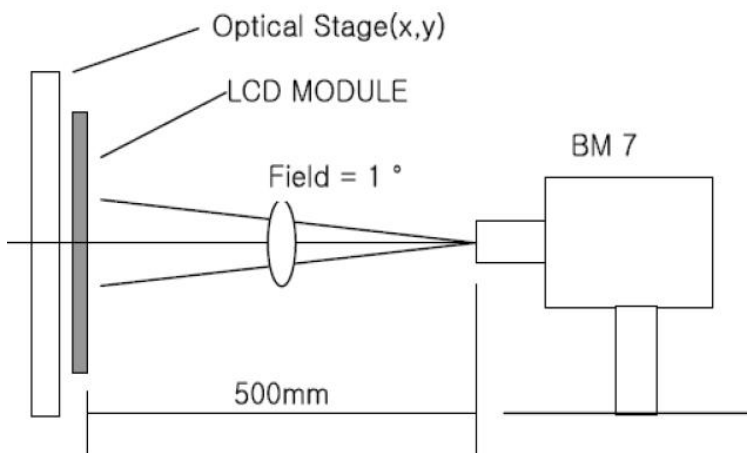
Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	400	500	-		Note1 Note2
Response Time	Ton	25°C	-	10	20	ms	Note1 Note3
	Toff		-	15	30		
View Angles	θT	$CR \geq 10$	40	50	-	Degree	Note 4
	θB		60	70	-		
	θL		60	70	-		
	θR		60	70	-		
Chromaticity	White	Brightness is on	x	0.30	0.32	0.34	Note5, Note1
			y	0.32	0.34	0.36	
Luminance	L		--	360	-	cd/m ²	Note1 Note6
Uniformity	U		75		-	%	Note1 Note7

Test condition: DVDD=3.3V, the ambient temperature is 25°C.

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

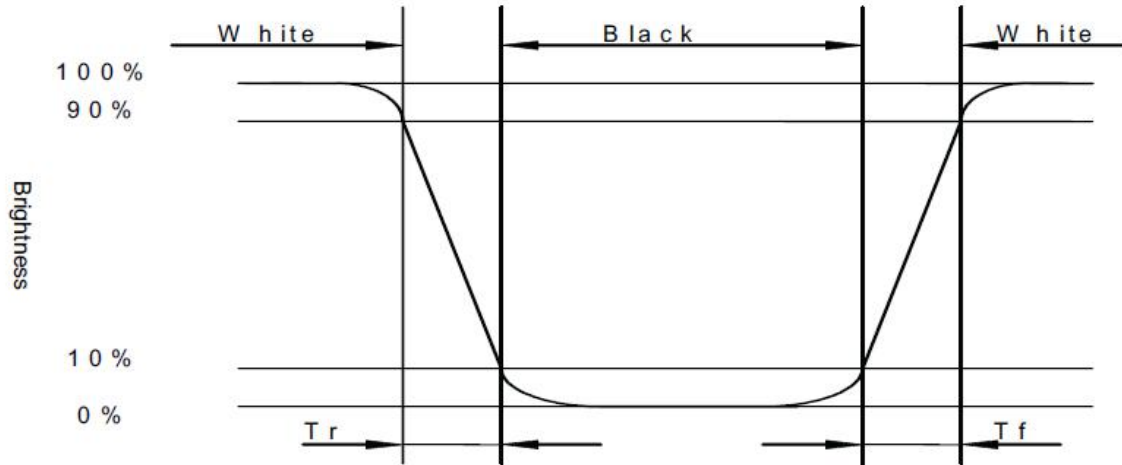


Note 2: Contrast ratio is defined as follow:

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

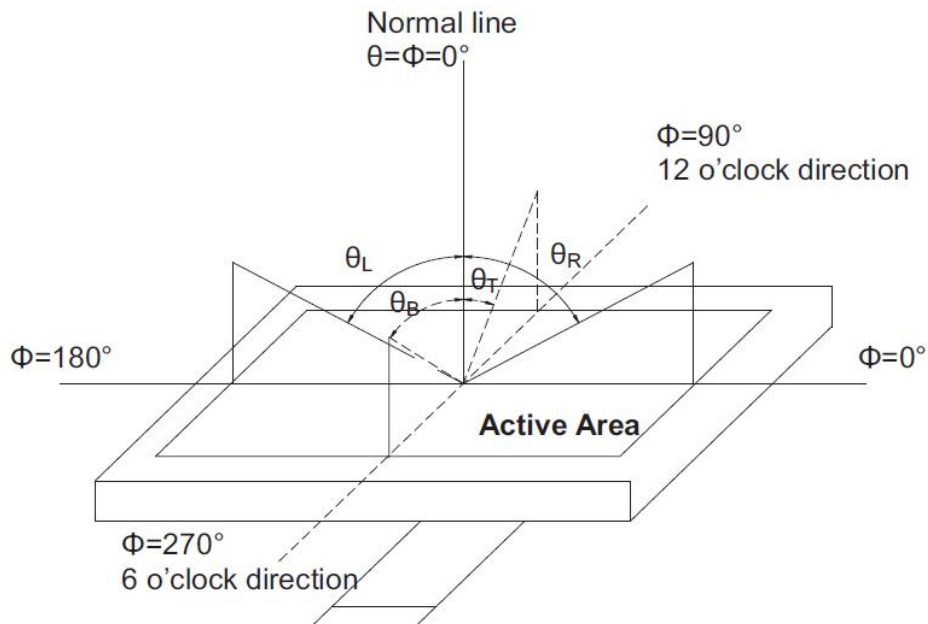
Note 3: Response time is defined as follow:

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).



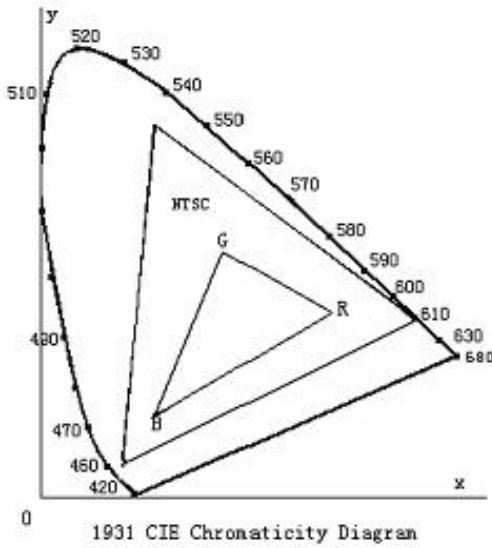
Note 4: Viewing angle range is defined as follow:

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.

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

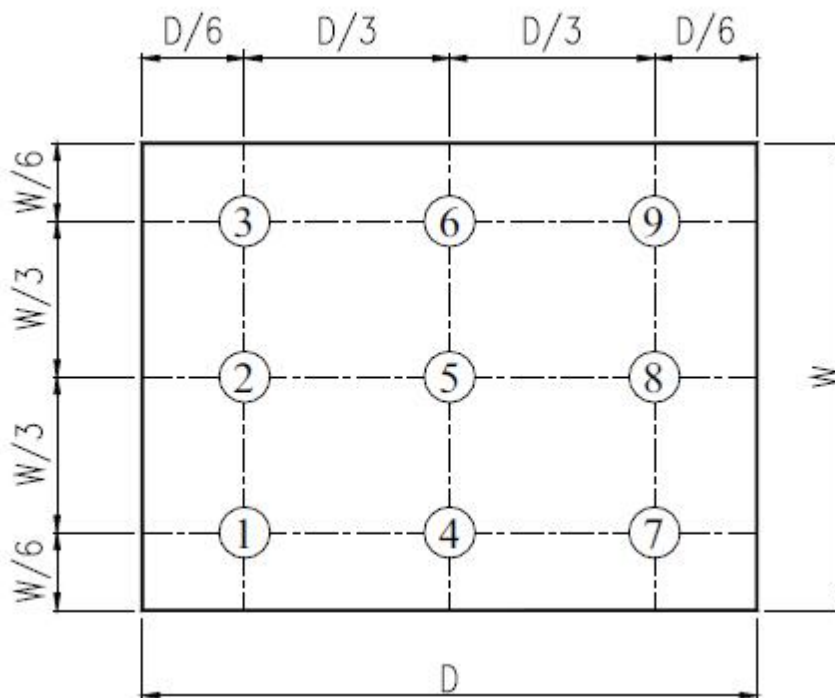


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70°C, 120hrs	Per table in below
2	Low Temp Operation	Ta=-20°C, 120hrs	Per table in below
3	High Temp Storage	Ta=+80°C, 120hrs	Per table in below
4	Low Temp Storage	Ta=-30°C, 120hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60°C, 90% RH 120 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, 5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times;	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)	60G 6ms, ±X,±Y,±Z 3times, for each direction	Per table in below
10	Package Drop Test	Height:80 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.

