

DLC Display Co., Limited

德爾西顯示器有限公司



MODEL No:DLC0283BUG

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Record of Revision

Date	Revision No.	Summary
2009-04-17	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC0283BUG active matrix 262kcolor TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 2.83" display area contains 240(RGB) x 320 pixels.

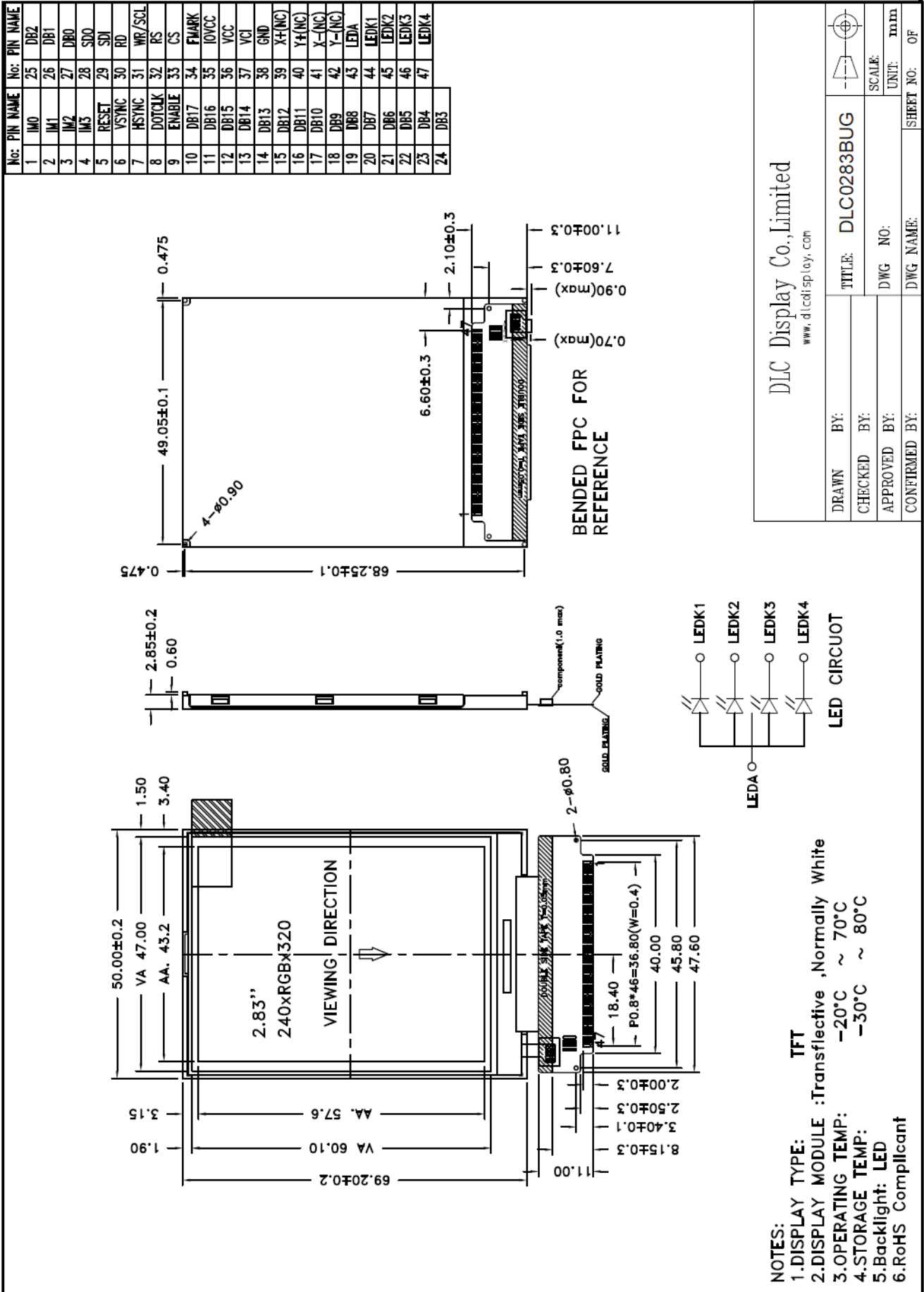
2. Application

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

3. General Information

Item	Contents	Unit
Size	2.83	inch
Resolution	240(RGB) X 320	/
Interface	System parallel interface	/
Color Depth	262K	/
Technology type	a-si TFT	/
Pixel pitch	0.18x0.18	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	50.00x69.20	mm
Active Area	47.00 x 60.10	mm
Display Mode	Transflective	/
Viewing Direction	12 o'clock	/
Backlight Type	LED	/
Driver IC	R61505W	

4. Outline Drawing



5. Interface signals

No	Symbol	Description	Remarks
1	IM0	Select a mode to interface to host processor. (Amplitude: IOVCC ~GND), Refer TO NOTE1	
2	IM1		
3	IM2		
4	IM3		
5	RESET	Reset signal, low active	
6	VSYNC	Frame synchronizing signal	
7	HSYNC	Frame synchronizing signal.	
8	DOTCLK	Dot clock signal.	
9	ENABLE	Data enable signal for RGB interface operation. (Amplitude: IOVCC-GND). Low: accessible (select) High: Not accessible (Not select) The polarity of ENABLE signal can be inverted by setting the EPL bit. (Amplitude: IOVCC-GND).	
10	DB17	18-bit parallel bi-directional data bus for 80-system interface operation (Amplitude: IOVCC-GND). 8-bit I/F: DB[17:10] are used. 9-bit I/F: DB[17:9] are used. 16-bit I/F: DB[17:10] and DB[8:1] are used. 18-bit I/F: DB[17:0] are used. 18-bit parallel bi-directional data bus for RGB interface operation (Amplitude: IOVCC-GND). 16-bit I/F: DB[17:13] and DB[11:1] are used. 18-bit I/F: DB[17:0] are used.	
11	DB16		
12	DB15		
13	DB14		
14	DB13		
15	DB12		
16	DB11		
17	DB10		
18	DB9		
19	DB8		
20	DB7		
21	DB6		
22	DB5		
23	DB4		
24	DB3		
25	DB2		
26	DB1		
27	DB0		
28	SDO	Serial data output (SDO) pin in serial interface operation. The data is outputted on the falling edge of the SCL signal. Amplitude: IOVCC-GND	
29	SDI	Serial data input (SDI) pin in serial interface operation. The data is inputted on the rising edge of the SCL signal. Amplitude: IOVCCGND	
30	RD	Read strobe signal in 80-system bus interface operation and enables read operation when RDX is low. Amplitude: IOVCC-GND	
31	WR/SCL	Write strobe signal in 80-system bus interface operation and enables write operation when WRX is low. Synchronous clock signal (SCL) in serial interface operation. Amplitude: IOVCC-GND	
32	RS	Register select signal. Amplitude: IOVCC-GND Low: select Index register High: select control register	
33	CS	Chip select signal. Amplitude: IOVCC-GND Low: the R61505W is selected and accessible	

		High: the R61505W is not selected and not accessible	
34	FMARK	Frame head pulse signal, which is used when writing data to the internal frame memory. (Amplitude: IOVCC-GND).	
35	IOVCC	Interface voltage.1.65V~3.3V	
36	VCC	Logic regulator power supply.2.5V~3.3V	
37	VCI	liquid crystal drive power supply voltage.2.5V~3.3V	
38	GND	POWER GROUND	
39	Y(U)	NO CONNECT	
40	X(L)	NO CONNECT	
41	Y(D)	NO CONNECT	
42	X(R)	NO CONNECT	
43	LEDA	LED ANODE	
44	LEDK1	LED CATHODE	
45	LEDK2	LED CATHODE	
46	LEDK3	LED CATHODE	
47	LEDK4	LED CATHODE	

Note1:

IM3	IM2	IM1	IM0	Interfacing Mode with Host processor	DB Pins	Colors
0	0	0	0	Setting inhibited	-	-
0	0	0	1	Setting inhibited	-	-
0	0	1	0	80-system 16-bit interface	DB[17:10], DB[8:1]	262,144 *see Note1
0	0	1	1	80-system 8-bit interface	DB[17:10]	262,144 *see Note2
0	1	0	0	Clock synchronous serial interface	-	65,536
0	1	1	0	Setting inhibited	-	-
0	1	1	1	Setting inhibited	-	-
1	0	0	0	Setting inhibited	-	-
1	0	0	1	Setting inhibited	-	-
1	0	1	0	80-system 18-bit interface	DB[17:0]	262,144
1	0	1	1	80-system 9-bit interface	DB[17:9]	262,144
1	1	0	0	Setting inhibited	-	-
1	1	0	1	Setting inhibited	-	-
1	1	1	0	Setting inhibited	-	-
1	1	1	1	Setting inhibited	-	-

Notes: 1. 262,144 colors in 16-bit 2-transfer mode. 65,536 colors in 16-bit 1-transfer mode.
2. 262,144 colors in 8-bit 3-transfer mode. 65,536 colors in 8-bit 2-transfer mode.

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Supply Voltage for logic	VCC/VCI/IOVCC	-0.3	4.6	V	-
Input voltage	VIN	-0.3	$IOV_{CC}+0.3$	V	-

6.2. Environment Conditions

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

6.3. LED Backlight Absolute max. ratings

Item	Symbol	MIN	MAX	Unit	Remark
LED Forward Current	I _{LED}	--	25	mA	For each LED
LED Reverse Voltage	V _R	--	1.2	V	

7. Electrical Specifications

7.1 Electrical characteristics

GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage for logic	VCI/VCC-VSS	2.7	2.8	2.9	V	
I/O power supply	IOVCC	1.7/2.7	1.8/2.8	1.9/2.9	V	
Put current	I _{dd}	-	9.64	19.28	mA	
Input Signal Voltage	Low Level	V _{IL}	-0.3	--	0.2 IOVcc	V
	High Level	V _{IH}	0.8 IOVcc	--	IOVcc	V
Output Signal Voltage	Low Level	V _{OL}	-	--	0.2 IOVcc	V
	High Level	V _{OH}	0.8 IOVcc	--	-	V

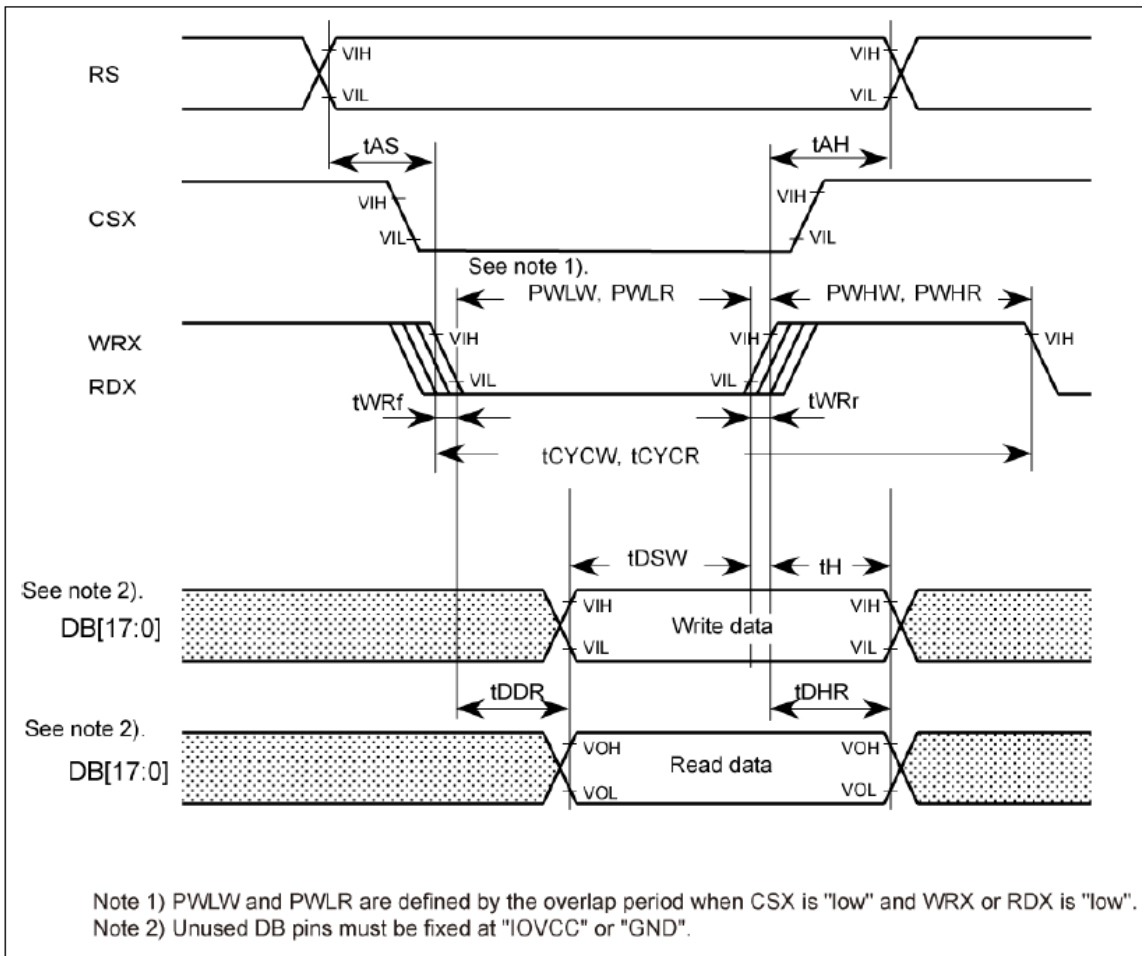
7.2 LED Backlight

Ta=25°C

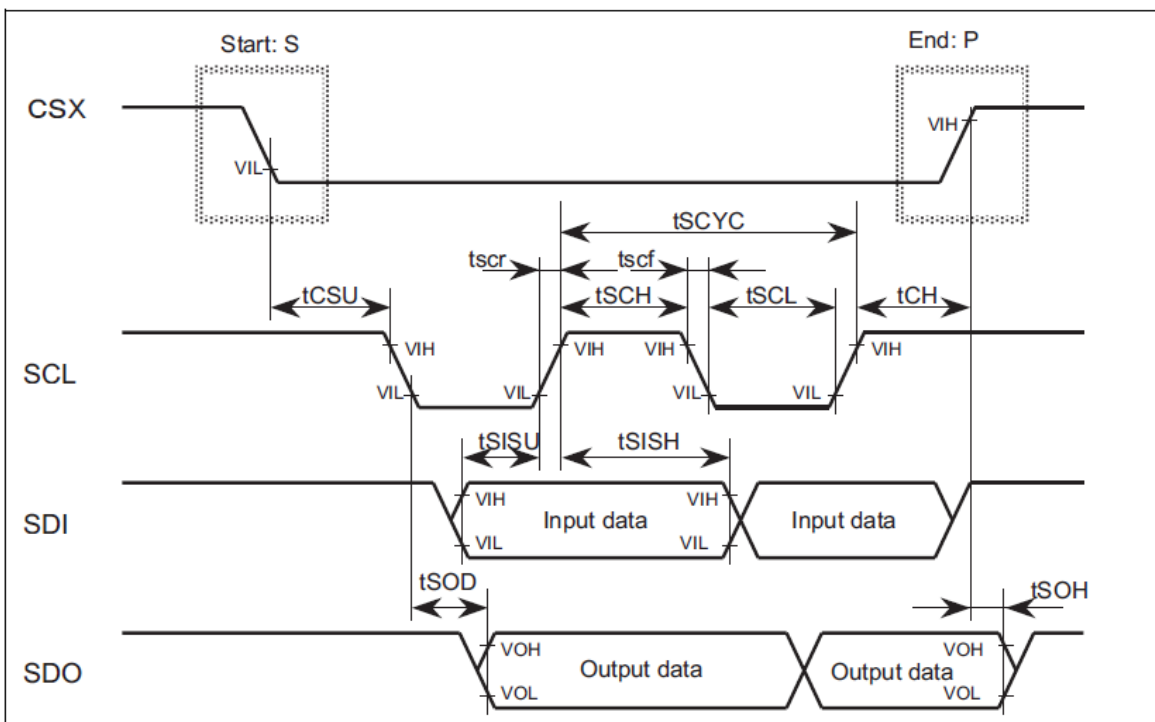
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I _F	--	15	25	mA	For each LED
Forward Voltage	V _F	2.9	3.2	3.4	2.9	
Power Consumption	WBL	--	192	--	mW	

8. Command/AC Timing

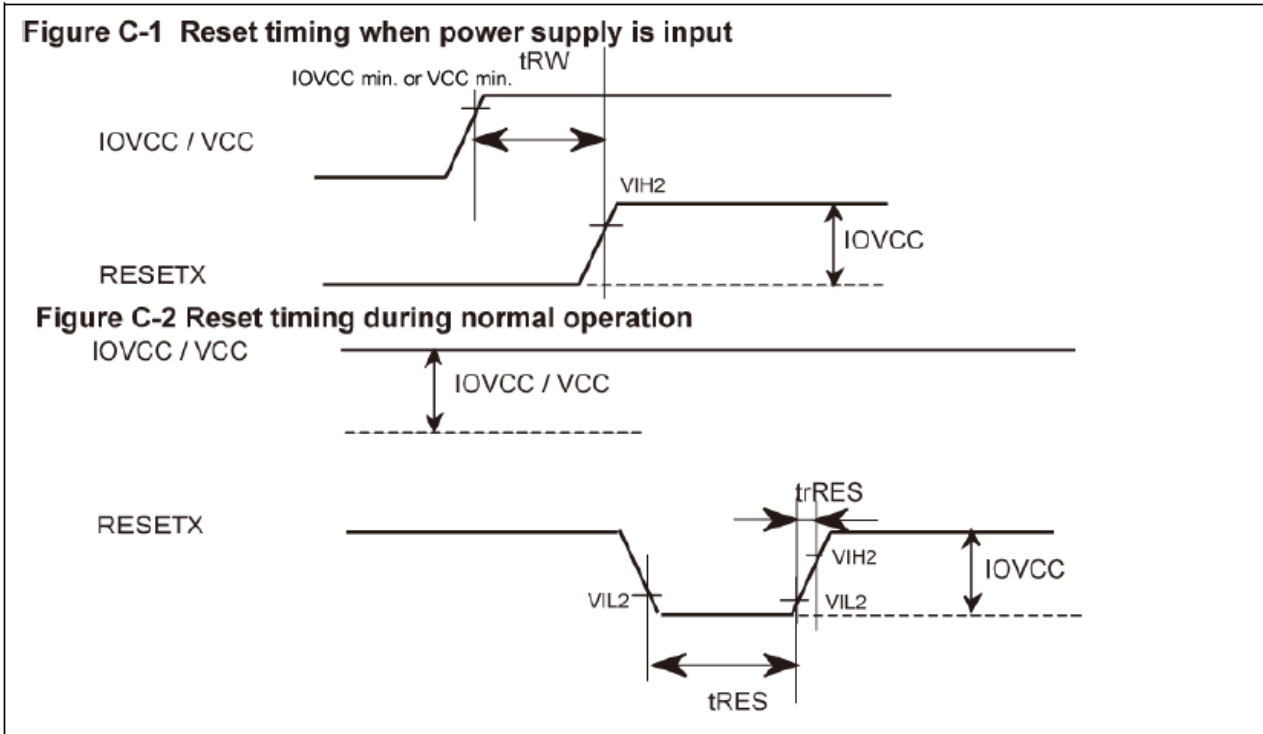
8.1 80-System Bus Interface



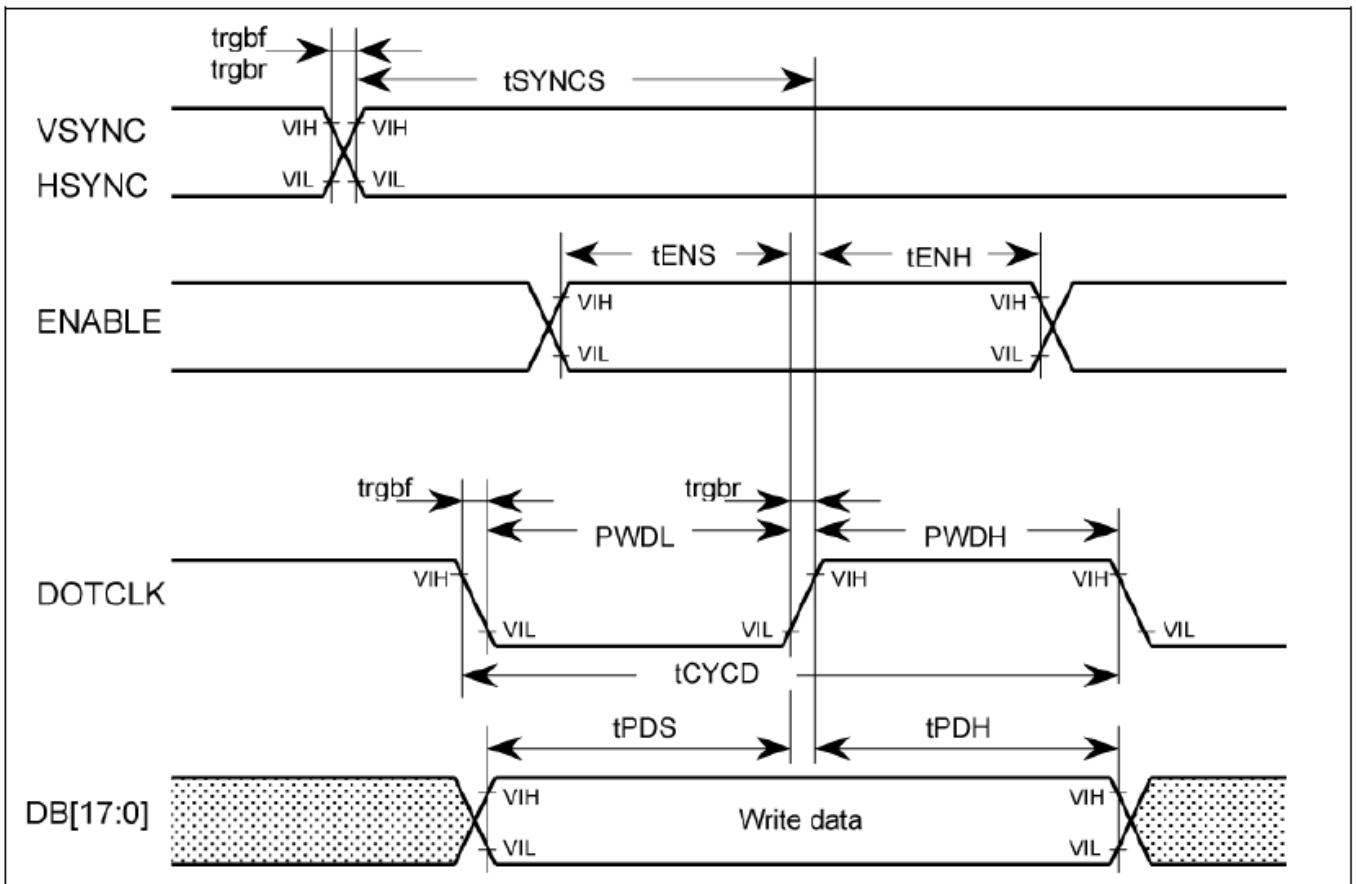
8.2 Clock Synchronous Serial Interface



8.3 Reset Operation



8.4 RGB Interface



9. Optical Specification

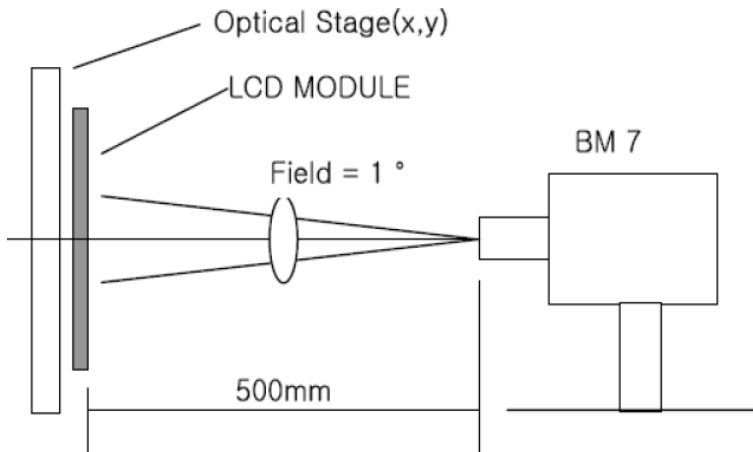
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	20	40	--		Note1 Note3
Response Time	Ton/ Toff	25°C	-	30	45	ms	Note1 Note4
View Angles	θT	$CR \geq 10$	70	80	-	Degree	Note 2
	θB		70	80	-		
	θL		70	80	-		
	θR		30	40	-		
Chromaticity	White	Brightness is on	x	0.2417	0.3017	0.3617	Note5, Note1
			y	0.2588	0.3188	0.3788	
Uniformity	U		70	88	-	%	Note1 Note6
Reflectivity	R		-	2.9883	-	%	
Luminance	L		133	160	-	cd/m ²	Note1 Note7

Note 1: Definition of optical measurement system.

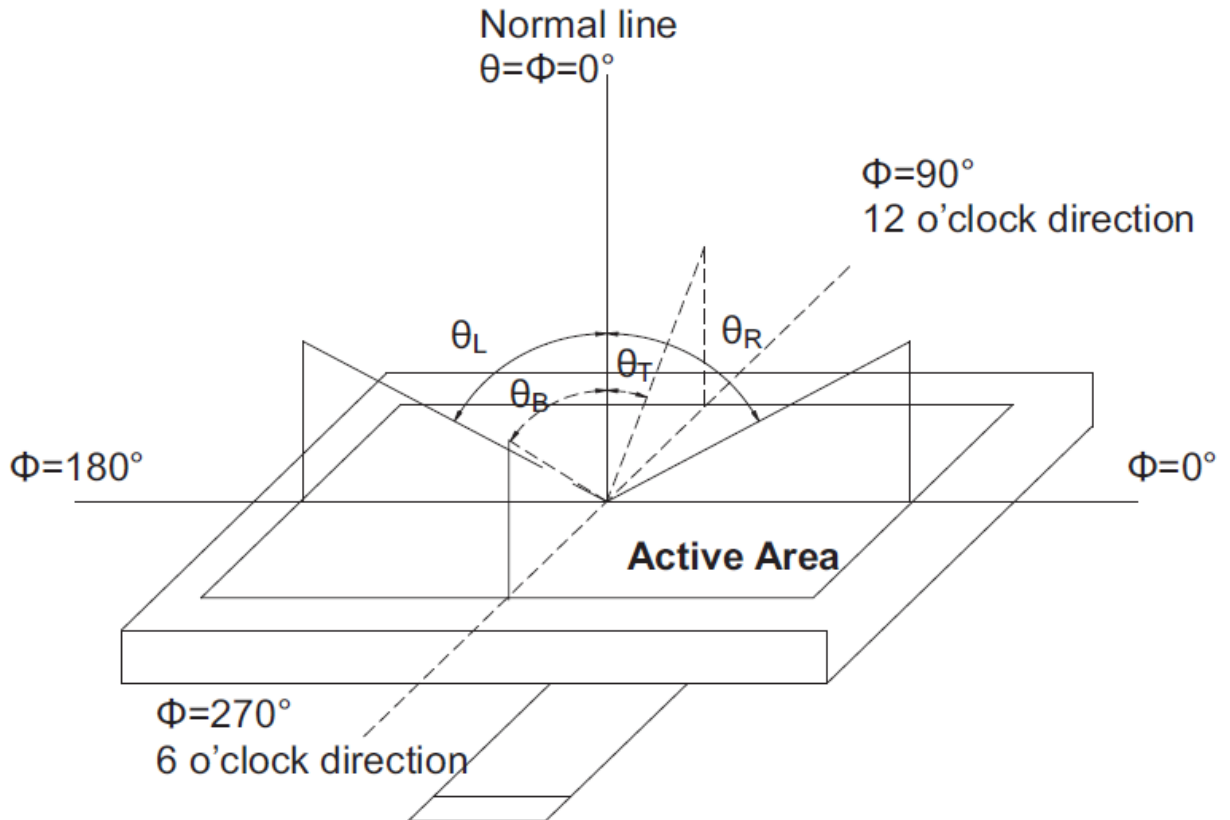
Temperature = 25°C(±3°C)

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



Note 2: Viewing angle range is defined as follow:

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

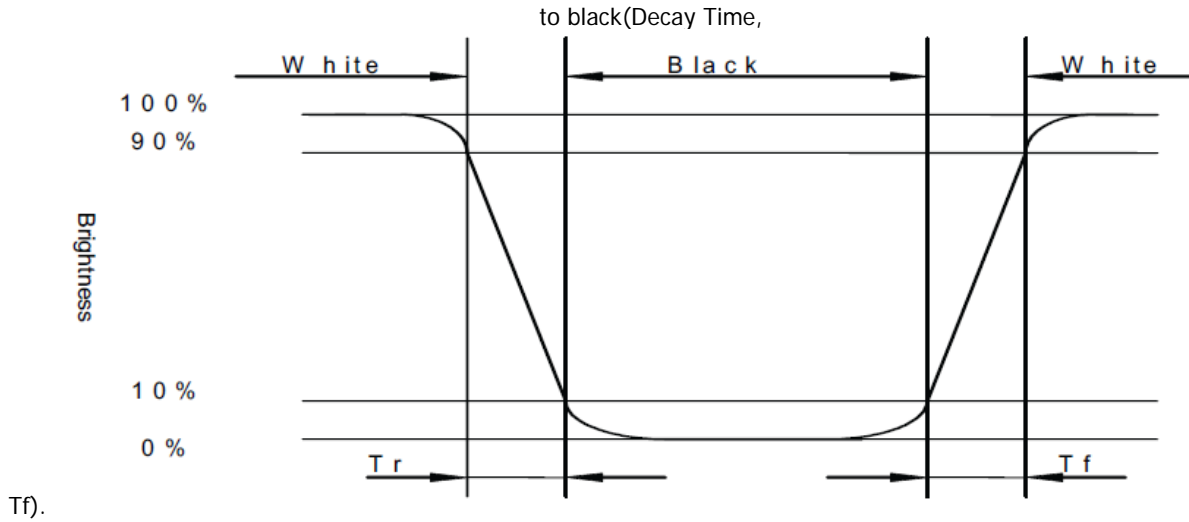


Note 3: Contrast ratio is defined as follow:

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

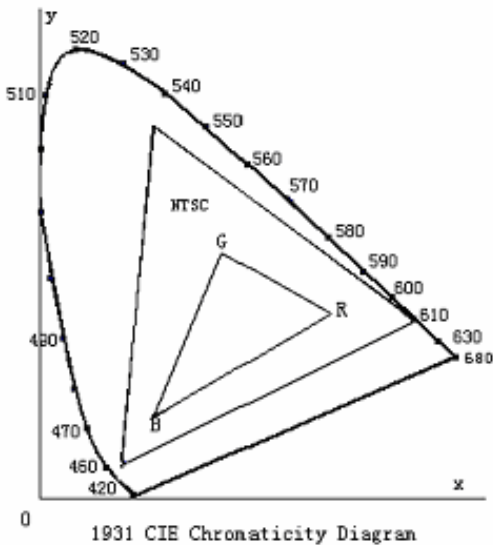
Note 4: Response time is defined as follow:

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



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 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.

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

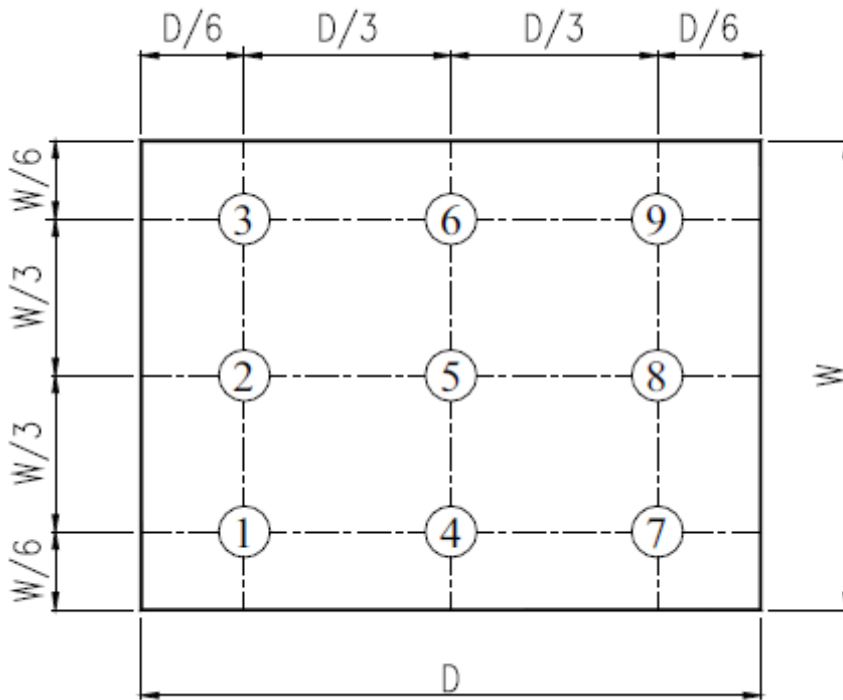


Fig. 2 Definition of uniformity

Note 7: Luminance is defined as follow:

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

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Operation Temp	Ts=+70°C, 120hrs	Per table in below
2	Low Operation Temp	Ta=-20°C, 120hrs	Per table in below
3	High Storage Temp	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=+40°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.

