

**DLC Display Co., Limited**

德爾西顯示器有限公司



MODEL No: DLC0840CZG

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### Record of Revision

Date	Revision No.	Summary
2008-12-20	1.0	Rev 1.0 was issued

## 1. Scope

This data sheet is to introduce the specification of DLC0840CZG active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 8.4'' display area contains 800(RGB) x600 pixels.

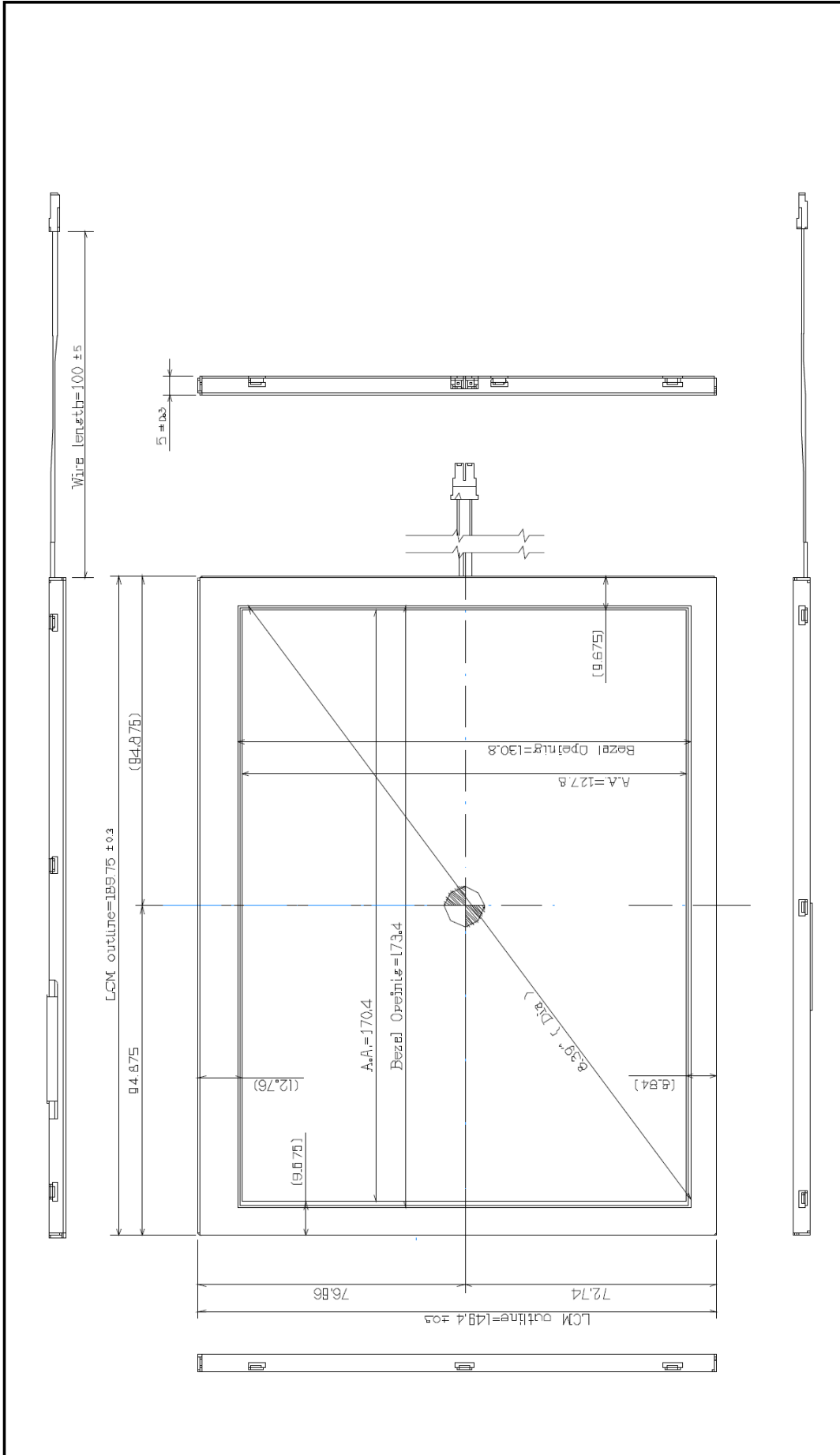
## 2. Application

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

## 3. General Information

Item	Contents	Unit
Size	8.4	inch
Resolution	800(RGB)x600	/
Interface	TTL	/
Technology type	a-Si TFT	/
Pixel pitch	0.213x0.213	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D )	189.75x149.40x5.00	mm
Active Area	170.40x127.80	mm
Display Mode	Transmissive, Normally white	/
Backlight Type	LED	/

### 4. Outline Drawing



**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 Compliant

DLC Display Co., Limited www.dlcdisplay.com		TITLE: DLC0840CZG		
DRAWN BY:	CHECKED BY:	DWG NO:	DWG NAME:	SCALE:
APPROVED BY:	CONFIRMED BY:			UNIT: mm
				SHEET NO: 0F



## 5. Interface signals

Terminal no.	Symbol	I/O	Function
1	AGND	P	Analog Ground
2	AVDD	P	Analog Power
3	VCC	P	Digital Power
4	R0	I	Data Input(LSB)
5	R1	I	Data Input
6	R2	I	Data Input
7	R3	I	Data Input
8	R4	I	Data Input
9	R5	I	Data Input
10	R6	I	Data Input
11	R7	I	Data Input(MSB)
12	G0	I	Data Input(LSB)
13	G1	I	Data Input
14	G2	I	Data Input
15	G3	I	Data Input
16	G4	I	Data Input
17	G5	I	Data Input
18	G6	I	Data Input
19	G7	I	Data Input(MSB)
20	B0	I	Data Input(LSB)
21	B1	I	Data Input
22	B2	I	Data Input
23	B3	I	Data Input
24	B4	I	Data Input
25	B5	I	Data Input
26	B6	I	Data Input
27	B7	I	Data Input(MSB)
28	DCLK	I	Clock input
29	DE	I	Data Enable signal
30	HSD	I	Horizontal sync input. Negative polarity
31	VSD	I	Vertical sync input. Negative polarity
32	MODE3	I	DE/SYNC mode select .normally pull high H:DE mode .L:HSD/VSD mode
33	RSTB	I	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability .normally pull high.
34	STBYB	I	Standby mode, normally pull high STBYB=1"
35	SHLR	I	Source right or left sequence control .SHLR=L"
36	VCC	P	Digital Power
37	UPDN	I	Gate up or down scan control. UPDN=L"
38	GND	P	Digital Ground
39	AGND	P	Analog Ground
40	AVDD	P	Analog Power
41	VCOM	I	For external VCOM DC input(Optional)
42	DITH	I	Dithering setting DITH=H" 6bit resolution (last 2 bits of input data truncated) (default setting) DITH=L" 8bit resolution "
43	NC	-	Not connect
44	NC	-	Not connect



45	V10	P	Gamma correction voltage reference
46	V9	P	Gamma correction voltage reference
47	V8	P	Gamma correction voltage reference
48	V7	P	Gamma correction voltage reference
49	V6	P	Gamma correction voltage reference
50	V5	P	Gamma correction voltage reference
51	V4	P	Gamma correction voltage reference
52	V3	P	Gamma correction voltage reference
53	V2	P	Gamma correction voltage reference
54	V1	P	Gamma correction voltage reference
55	NC	-	Not connect
56	VGH	P	Positive Power for TFT
57	VCC	P	Digital Power
58	VGL	P	Negative Power for TFT
59	GND	P	Digital Ground
60	NC	-	Not connect

Recommend connector: FH28-60S-0.5SH(HIROSE) or equivalent 60pins, pitch=0.5mm.

## 6. Absolute maximum Ratings

### 6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power supply voltage	AVDD	-0.5	15.0	V	AGND=0
	VCOM	0	6.0		
	VCC	-0.3	5.0		GND=0
Input Voltage	VI	-0.3	VCC +0.3		

### 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 Current	IL		25	mA	One LED



## 7. Electrical Specifications

### 7.1 Electrical characteristics

AGND=DGND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage	VCC	2.7	3.0	3.5	V	
	VGH	14.0	15.0	16.0	V	
	VGL	-8.0	-7.0	-6.0	V	
	AVDD	9.85	10.0	10.15	V	
Current of power supply	ICC	--	TBD	--	mA	VCC = 3.0V
	IGH	--	TBD	--	mA	VGH = 15V
	IGL	--	TBD	--	mA	VGL = -9V
	IADD	--	TBD	--	mA	AVDD = 10V
Input Signal Voltage	VIL	0	--	0.3VCC	V	Note 1
	VIH	0.7VCC	--	VCC	V	
Input level of V1~V5	Vx	AVDD/2	--	AVDD-0.1	V	
Input level of V6~V10	Vx	0.1	--	AVDD/2	V	

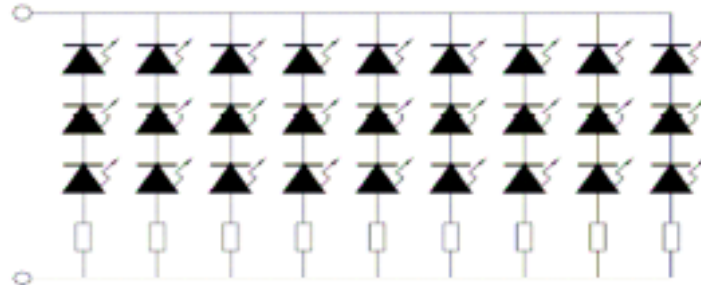
Note 1: VSYNC, HSYNC, DE, Digital Data

### 7.2 LED Backlight

Ta=25°C

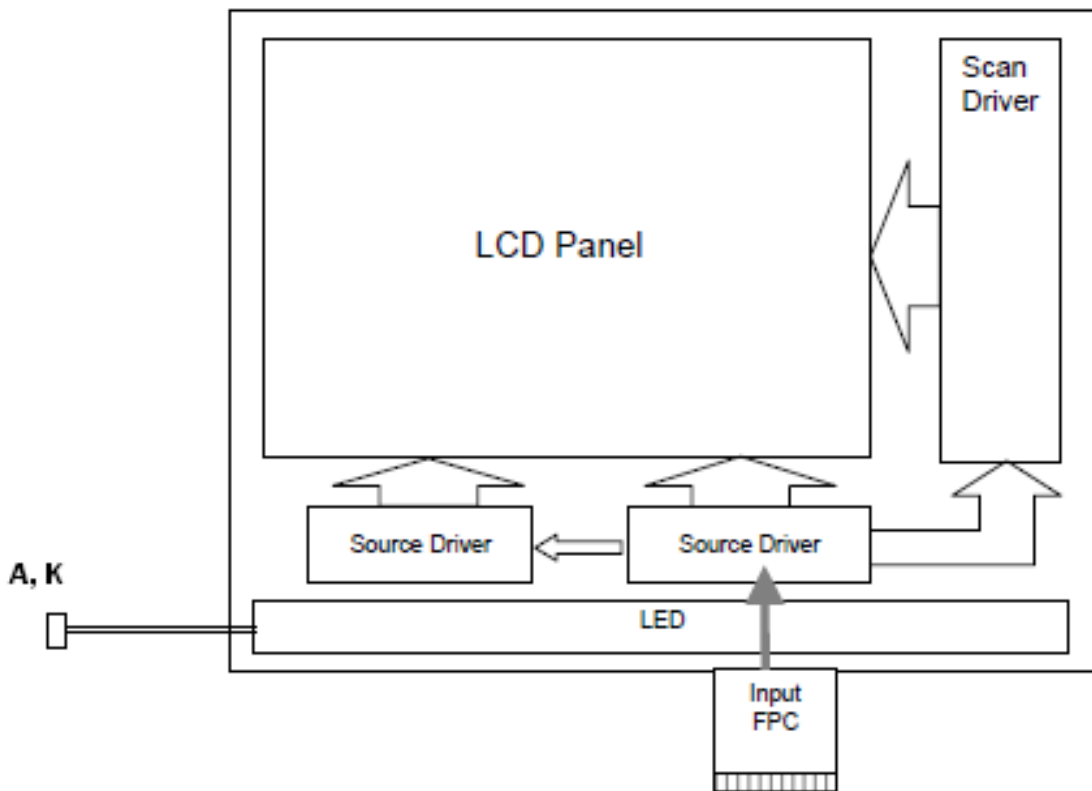
This backlight is an side-light type with 27 LEDs.

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED Current	IL	--	180	--	mA	
LED Voltage	VL	--	10.5	--	V	



LED Light Bar Circuit

### 7.3 Schematic of LCD module system

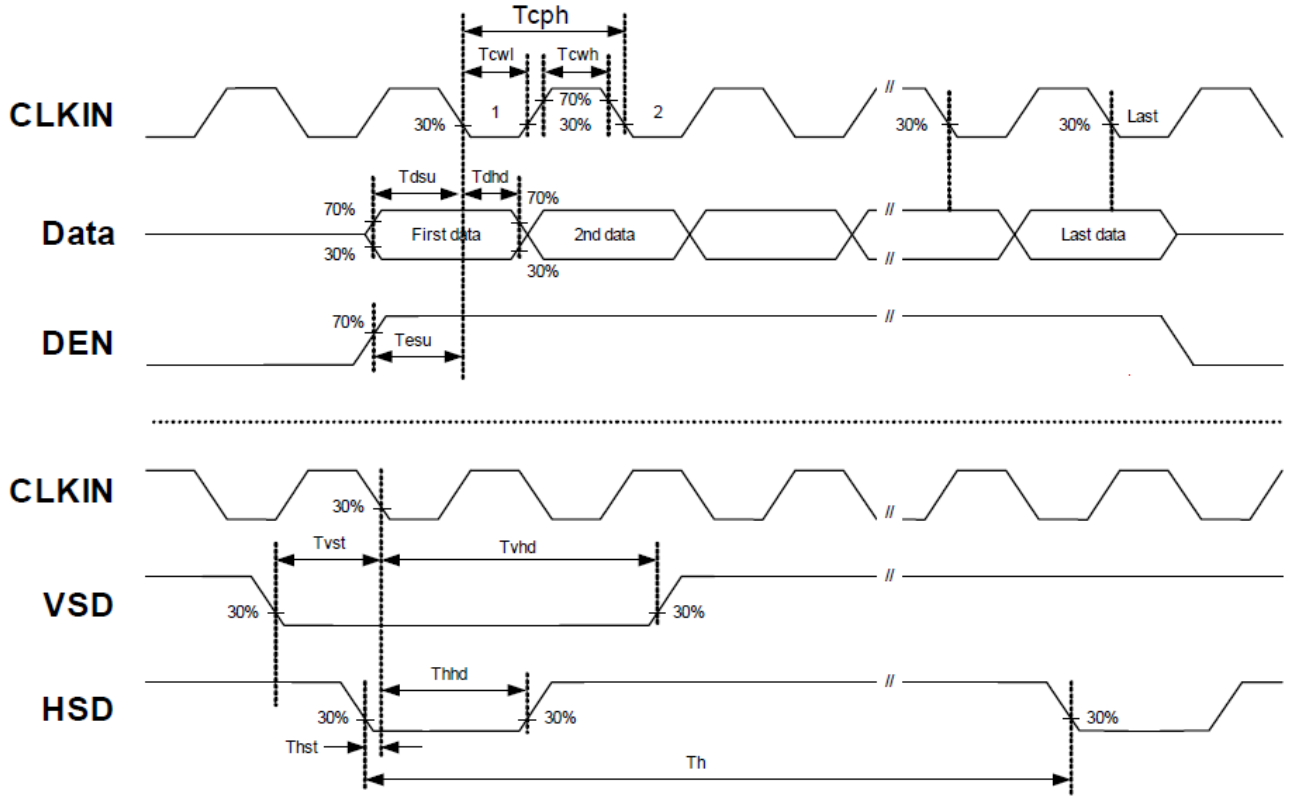


## 8. Command/AC Timing

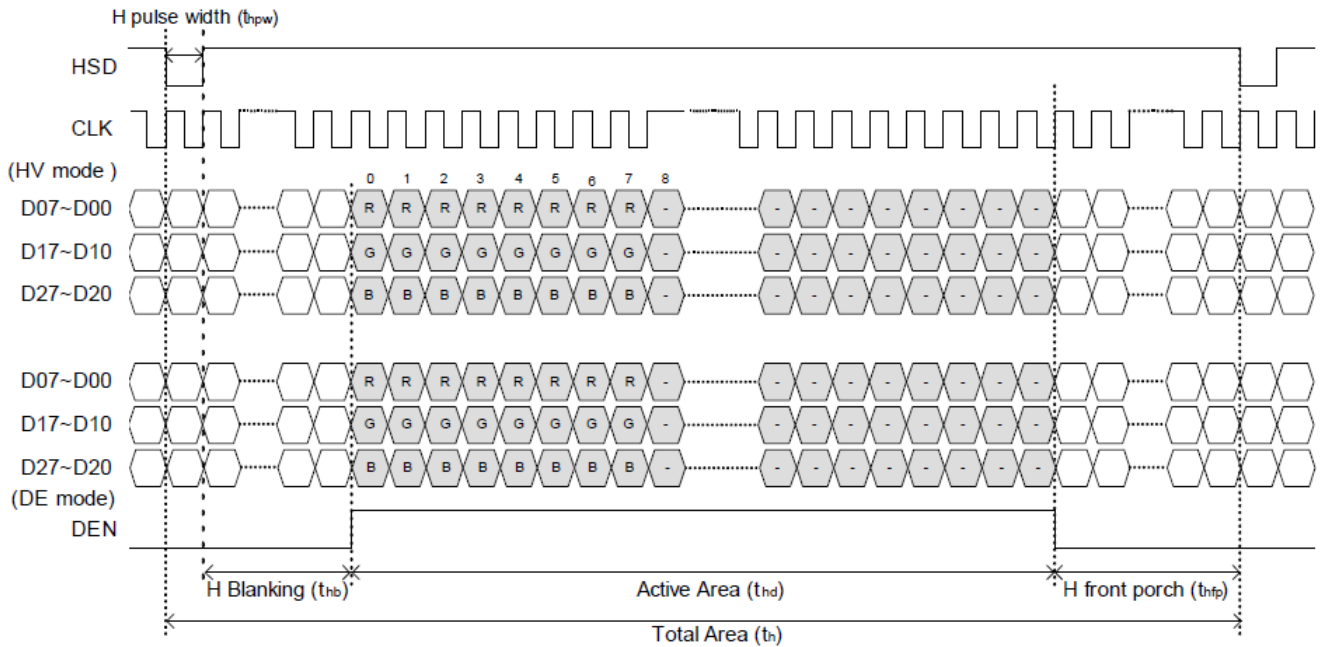
### 8.1 AC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20			ns	
DCLK frequency	fclk		40	50	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		1000		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		40		Tcph	
HSD front porch	thfp		112		Tcph	
Vertical display area	tvd		600		th	
VSD period time	tv		660		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		36		th	
VSD front porch	tvfp		21		th	

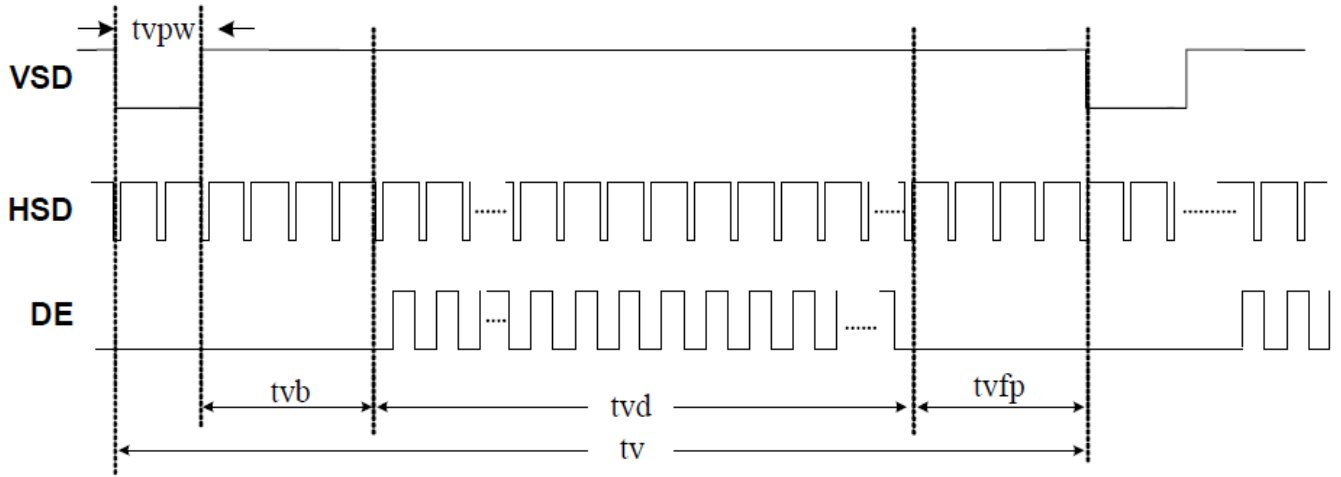
## 8.2 Timing of Interface Signal



Sampling clock timing

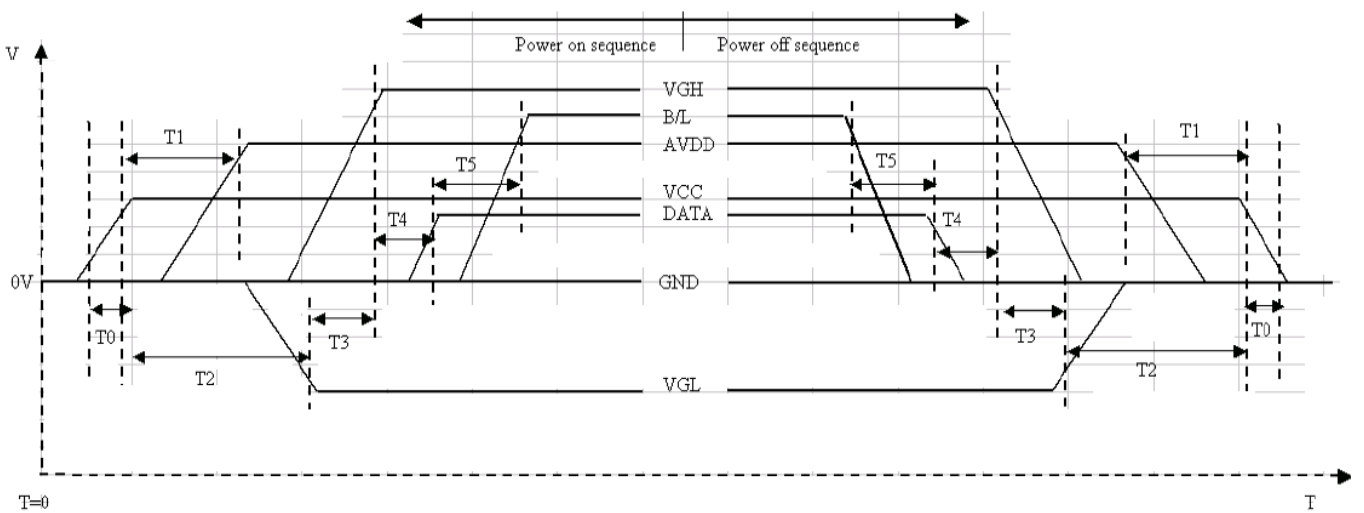


Horizontal display timing range

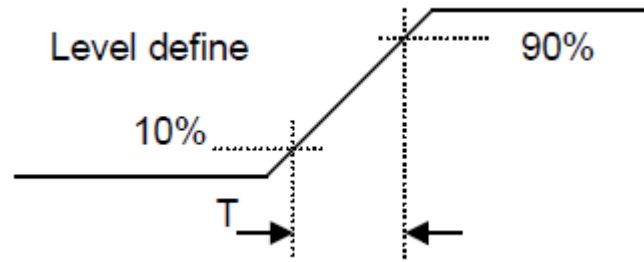


Vertical timing

### 8.3 Power Sequence



Item	Min.	Typ.	Max.	Unit
T0	0.5	--	20	msec
T1	16			msec
T2	20			msec
T3	10			msec
T4	10		50	msec
T5	50			msec



Power on sequence: VCC → AVDD → VGL → VGH → Data → B/L

Power off sequence: B/L → Data → VGH → VGL → AVDD → VCC

Notes: Data include R0~R7, G0~G7, B0~B7, VSD, HSD, DCLK, SHLR, UPDN, DE, RSTB, STBYB, SHLR, DITH

9. Optical Specification

Ta=25°C

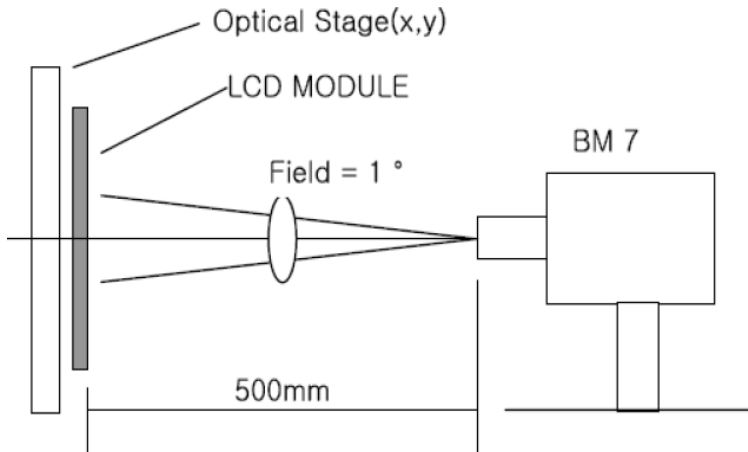
Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	500	600	--		Note1 Note2
Response Time	Tr		--	4	8	ms	Note1
	Tf		--	12	24		Note3
View Angles	$\theta T$	$CR \geq 10$	50	60	--	Degree	Note 4
	$\theta B$		60	70	--		
	$\theta L$		65	75	--		
	$\theta R$		65	75	--		
Chromaticity	white	Brightness is on	x	0.260	0.310	0.360	Note5, Note1
			y	0.280	0.330	0.380	
Luminance	L		200	250	-	cd/m <sup>2</sup>	Note1 Note6
Uniformity	U		70	-	-	%	Note1 Note7

Test condition: VL=10.5V, IL=180mA.

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

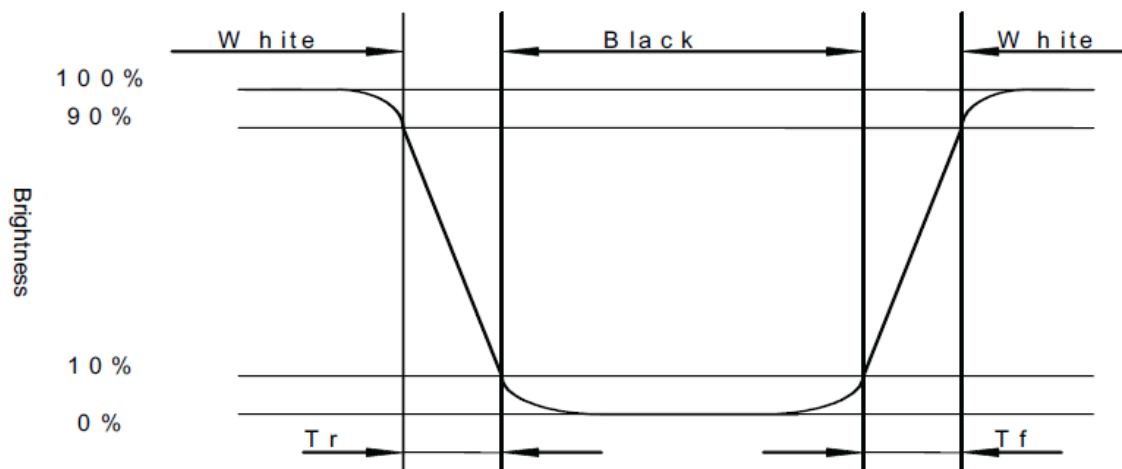


Note 2: Contrast ratio is defined as follow:

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

Note 3: Response time is defined as follow:

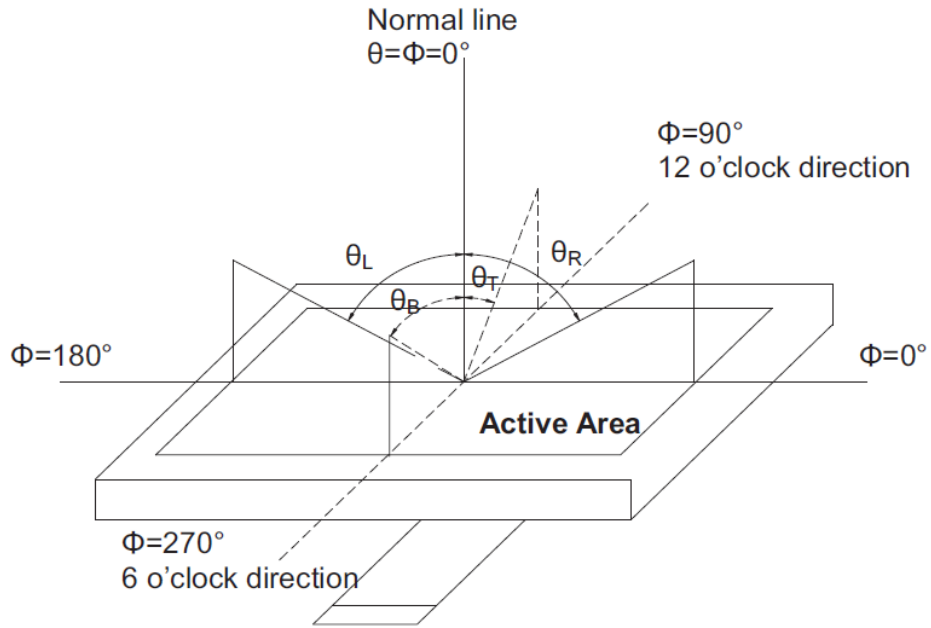
Response time is the time required for the display to transition from black to white (Rise Time,  $T_r$ ) and from white to black (Decay Time,  $T_f$ ).





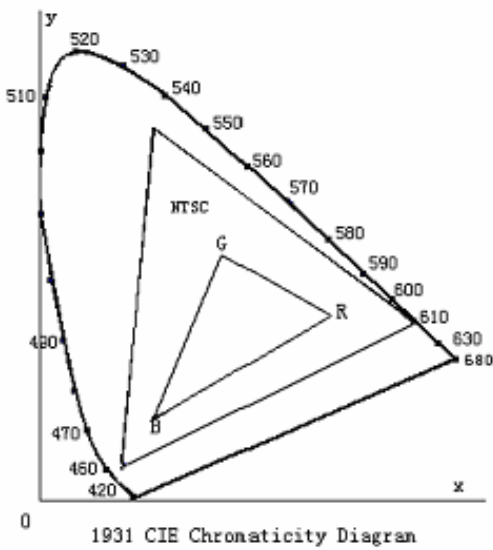
Note 4: Viewing angle range is defined as follow:

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.

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

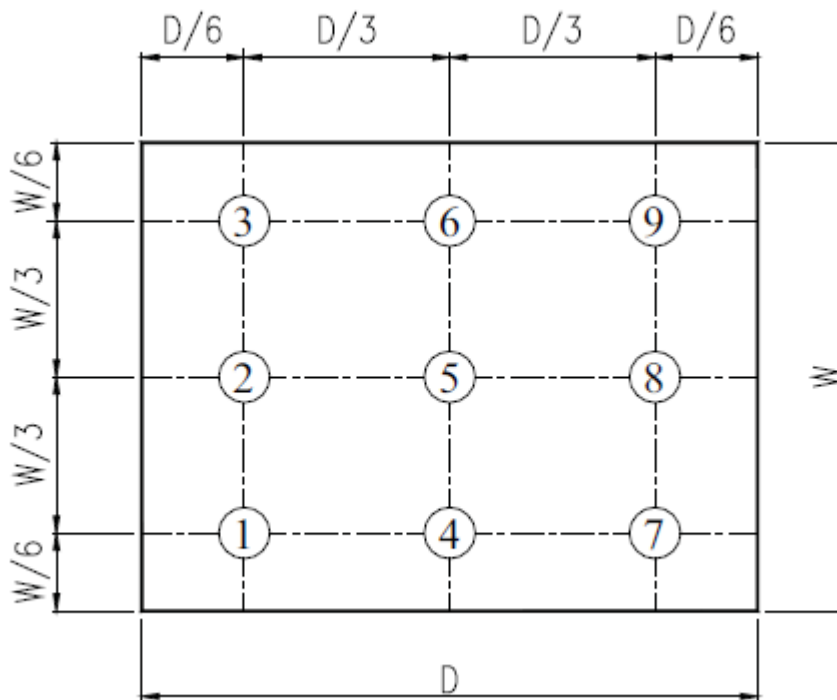


Fig. 2 Definition of uniformity

## 10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operating	Ts=+70°C, 240hrs	Per table in below
2	Low Temp Operation	Ta=-20°C, 240hrs	Per table in below
3	High Temp Storage	Ta=+80°C, 240hrs	Per table in below
4	Low Temp Storage	Ta=-30°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, 200 Cycles	Per table in below
7	ESD (Operation)	±200V,200pF(0ohm) , 1 time /each terminal	Per table in below
8	Vibration (Non-operation)	1.Random: 1.04Grms, 5~500Hz, X/Y/Z, 30min/each direction 2. Sine: Freq. Range: 8~33.3Hz Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hr, Y: 4hr, cyc: 15min	Per table in below
9	Shock (Non-operation)	100G, 6ms, ±X, ±Y, ±Z 3 time for each direction	Per table in below
10	Package Drop Test	Height: 60cm 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.

