

DLC Display Co., Limited

德爾西顯示器有限公司



MODEL No: DLC0550CZM

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Record of Revision

Date	Revision No.	Summary
2016-05-06	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC0550CZM active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 5.46" display area contains 1080(RGB) x 1920 pixels.

2. Application

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

3. General Information

Item	Contents	Unit
Size	5.46	inch
Resolution	1080(RGB) x 1920	/
Interface	MIPI	/
Technology type	IPS TFT	/
Pixel pitch	0.063x0.063	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	70.54x128.86x1.5	mm
Active Area	68.04 x120.96	mm
Display Mode	Transmissive	/
Backlight Type	LED	/
Driver IC	ILI9885	/

5. Interface signals

NO.	PIN NAME	Description
1	GND	Ground
2	VCC	Power Supply 2.8V
3	NC	-
4	GND	Ground
5	NC	-
6	NC	-
7	NC	-
8	NC	-
9	GND	Ground
10	LEDK2	LED Cathode
11	LEDK1	LED Cathode
12	LEDA	LED Anode
13	GND	Ground
14	IOVCC	Power Supply 1.8V-2.8V
15	GND	Ground
16	NC	-
17	GND	Ground
18	NC	-
19	GND	Ground
20	RESET	LCM Reset input signal
21	TE	Tearing effect output
22	PWM	This pin is connected to the external LED driver.
23	GND	Ground
24	D2P	DSI-D2+clock signals
25	D2N	DSI-D2-clock signals
26	GND	Ground
27	D1P	DSI-D1+ clock signals
28	D1N	DSI-D1-clock signals
29	GND	Ground
30	CLKP	DSI-CLK+ clock signals
31	CLKN	DSI-CLK-clock signals
32	GND	Ground
33	D0P	DSI-D0+ clock signals
34	D0N	DSI-D0-clock signals
35	GND	Ground
36	D3P	DSI-D3+ clock signals
37	D3N	DSI-D3-clock signals
38	GND	Ground
39	ID	-
40	GND	Ground

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power supply voltage for logic	VDD	0.3	4.6	V	
Input voltage	Vin	--	VDD+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 Electrical characteristics

Ta=25°C

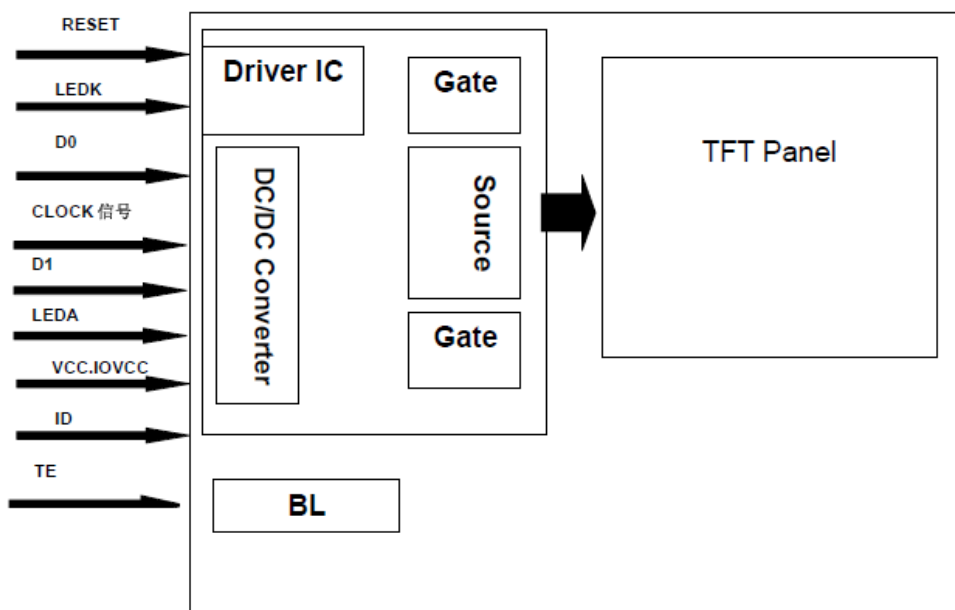
Item	Symbol	MIN	TYP	MAX	Unit	Remark
LC Operating Voltage	VOP	--	-	4.5	V	

7.2 LED Backlight

Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF		40		mA	
Forward Voltage	VF		19.2		V	

7.3 Block Diagram



8. Command/AC Timing

8.1 Interface: System Bus Read/Write Characteristics.

(VSS=VSSI=DVSS=0V, VDDI=1.65V to 3.3V, VDD=2.5V to 3.5V, Ta = -30 to 70 °C)

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-CLK+/-	$2xU_{INST}$	Double UI instantaneous	3.64	-	25	ns	
DSI-CLK+/-	U_{INSTA} U_{INSTB}	UI instantaneous halves	1.82	-	12.5	ns	$UI = U_{INSTA} = U_{INSTB}$
DSI-Dn+/-	t_{DS}	Data to clock setup time	$0.15xUI$	-	-	ps	
DSI-Dn+/-	t_{DH}	Data to clock hold time	$0.15xUI$	-	-	ps	
DSI-CLK+/-	t_{DRTCLK}	Differential rise time for clock	150	-	$0.3xUI$	ps	
DSI-Dn+/-	$t_{DRTDATA}$	Differential rise time for data	150	-	$0.3xUI$	ps	
DSI-CLK+/-	t_{DFTCLK}	Differential fall time for clock	150	-	$0.3xUI$	ps	
DSI-Dn+/-	$t_{DFTDATA}$	Differential fall time for data	150	-	$0.3xUI$	ps	

Note) Dn = D0, D1

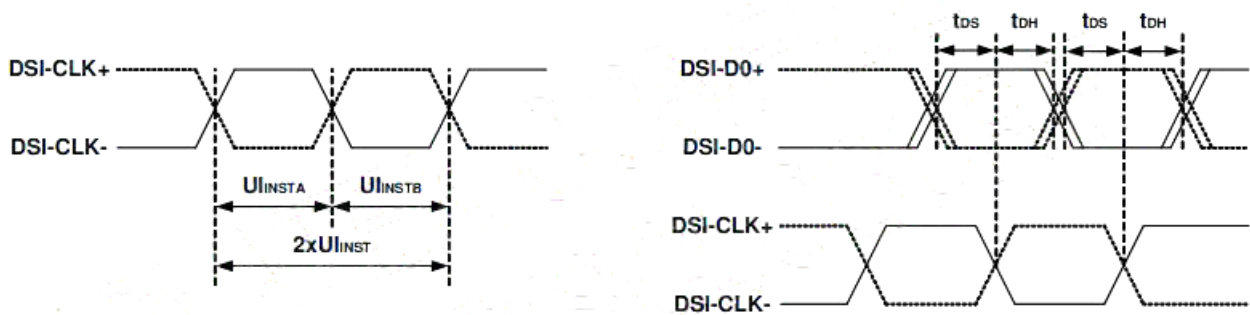


Fig. 7.6.3 DSI clock channel timing

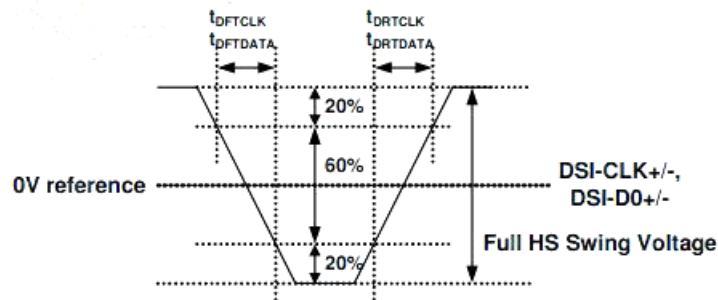


Fig. 7.6.4 Rising and fall time on clock and data channel

9 Optical Specification

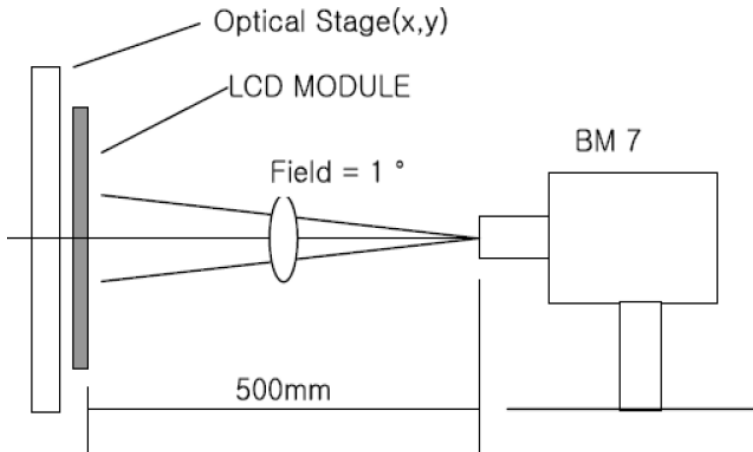
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	640	800	-		Note1 Note2
Response Time	Tr	25°C	-	10	15	ms	Note1 Note3
	Tf		-	20	25		
View Angles	θT	$CR \geq 10$		80	89	Degree	Note 4
	θB			80	89		
	θL			80	89		
	θR			80	89		
Chromaticity	White	Brightness is on	x	0.285	0.305	0.325	Note5, Note1
			y	0.301	0.321	0.341	
Luminance	L			400	-	cd/m ²	Note1 Note6
Uniformity	U		--	70	-	%	Note1 Note7
Transmittance (with polarizer)				3.0		%	

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

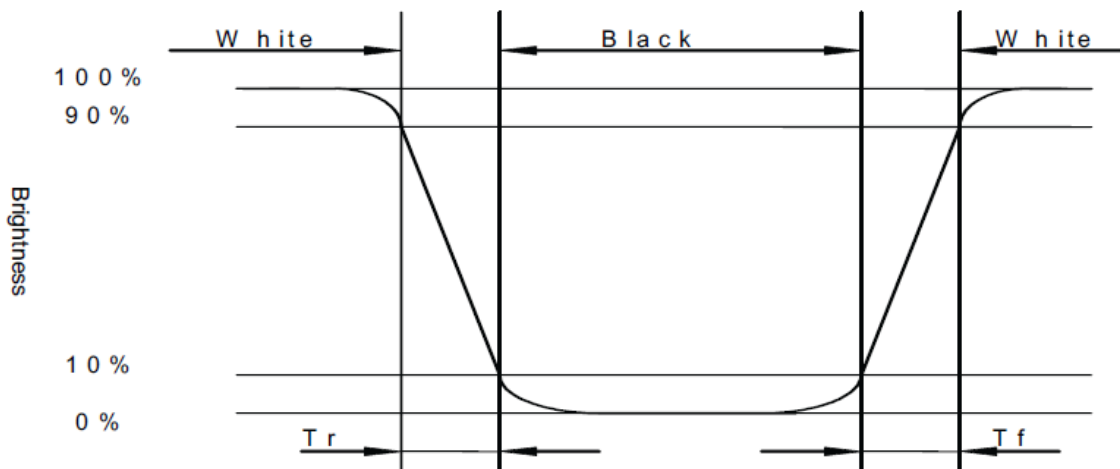


Note 2: Contrast ratio is defined as follow:

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

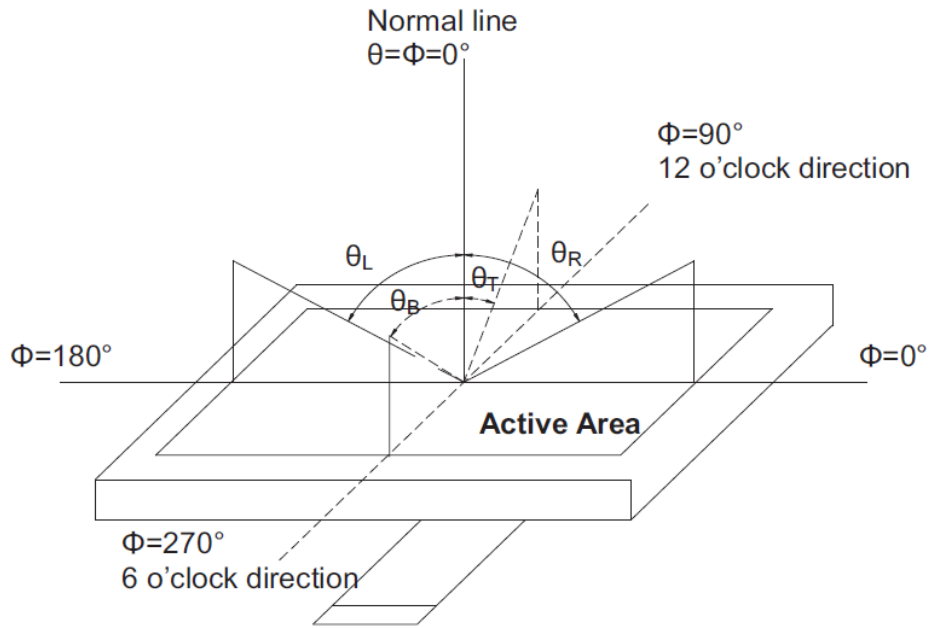
Note 3: Response time is defined as follow:

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).



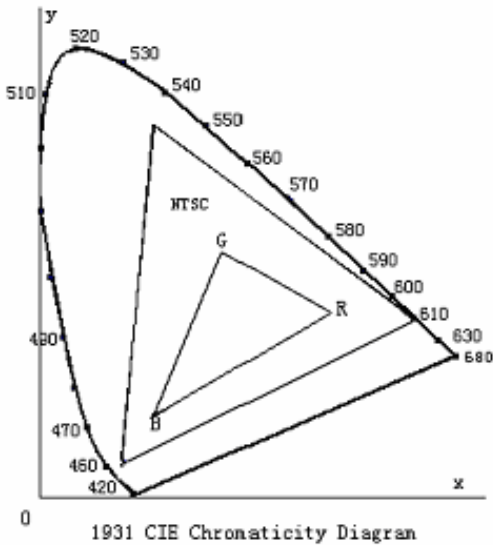
Note 4: Viewing angle range is defined as follow:

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.

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

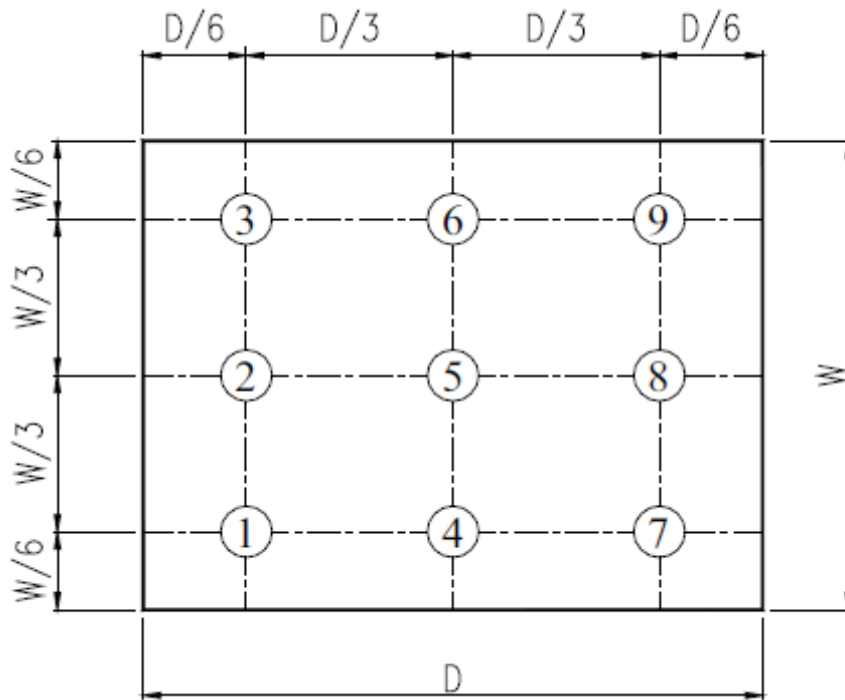


Fig. 2 Definition of uniformity

6. 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)	-20°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

7. 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.

