DLC Display Co., Limited

德爾西顯示器有限公司

MODEL No:DLC0240PZG

TEL: 86-755-86029824

FAX: 86-755-86029827

E-MAIL: sales@dlcdisplay.com

WEB: www.dlcdisplay.com

Record of Revision

Date	Revision No.	Summary
2015-12-03	1.0	Rev 1.0 was issued
2016-03-08	1.1	Update the backlight
2016-05-27	1.2	Revise pin description
2016-12-28	1.3	Changethe IC to ILI9341V
2019-12-15	1.4	Modify the Chromaticity

1. Scope

This data sheet is to introduce the specification of DLC0240PZG active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPCand abacklight unit. The 2.40" display area contains 240(RGB) x 320 pixels.
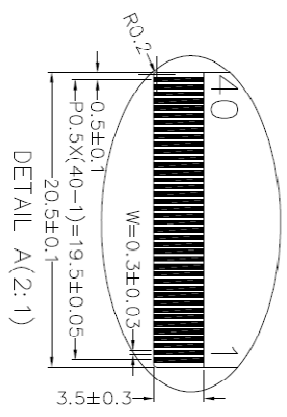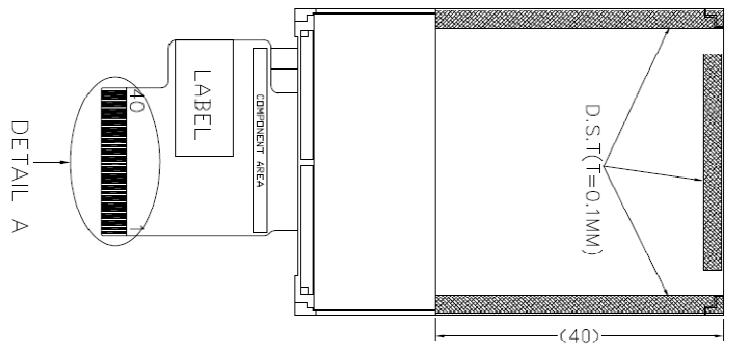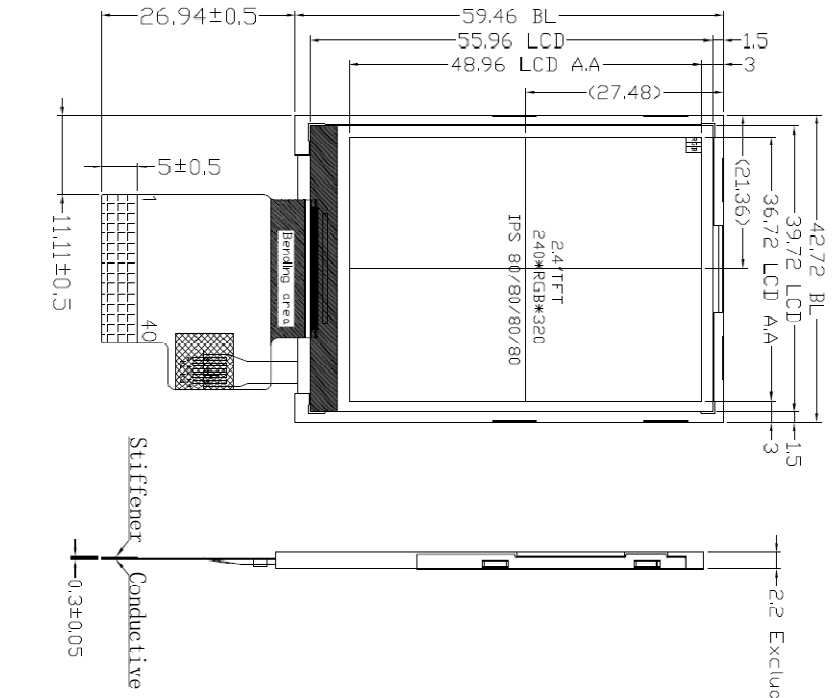
2. Application

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

3. General Information

Item	Contents	Unit
Size	2.4	inch
Resolution	240(RGB) x 320	/
Interface	RGB/MCU	/
Technology type	IPS	/
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	42.72x59.46x2.20	mm
Active Area	36.72x48.96	mm
Display Mode	Trans-missive	/
Backlight Type	LED	/
Driver IC	ILI9341V	/
Weight	TBD	g

4. Outline Drawing

NOTES：

1. DISPLAY TYPE：2.4″TFT, TRANSMISSIVE
2. VIEWING DIRECTION：U/L/D/R 80/80/80/80
3. Driver IC：ILI9341V
4. Top：-20°C ~ 70°C, Tst：-30°C ~ 80°C
5. GENERAL TOLERANCE：±0.2
6. RoHs Compliant

2.4″TFT
240*RGB*320
IPS 80/80/80/80

Bending area

Stiffener Conductive

DETAIL A

LABEL

COMPONENT AREA

D.S.T(T=0.1MM)

LED CIRCUIT DIAGRAM:

LEDK

LEDA

4EA   If=60mA

DETAIL A(2:1)

W=0.3±0.03

0.5±0.1
P0.5X(40-1)=19.5±0.05
20.5±0.1

3.5±0.3

R0.2

DLC Display Co.,Limited
www.dlcdisplay.com

DRAWN	BY:		
CHECKED	BY:		
APPROVED	BY:		
CONFIRMED	BY:		

TITLE: DLC0240PZG

DWG NO:

DWG NAME:

SCALE: UNIT: mm

SHEET NO: OF

PIN ASSIGNMENT:

PIN		PIN	
1	VDD	21	DB0
2	IOVCC	22	SDA(SDI)
3	DB17	23	DOTCLK
4	DB16	24	DE
5	DB15	25	HSYNC
6	DB14	26	VSYNC
7	DB13	27	RD
8	DB12	28	WR(D/C)
9	DB11	29	DC(SCL)
10	DB10	30	CS
11	DB9	31	RESET
12	DB8	32	IM0
13	DB7	33	IM1
14	DB6	34	IM2
15	DB5	35	IM3
16	DB4	36	NC
17	DB3	37	GND
18	DB2	38	VCI
19	DB1	39	VPP_OTP
20	DB1	40	LED-A
			LED-A
			LED-K

5. Interface signals

Pin No.	Symbol	I/O	Function
1	VDDD	P	No connection
2	IOVCC	P	Digital I/O pad power supply
3-20	DB17-DB0	I	Data Bus
21	SDA(SDI)	I	When IM3=0,serves as a serial in/out signal.(SDA) When IM3=1, serves as a serial in signal.(SDI) The data is applied on the rising edge of the SCL signal. If ont used, fix this pin at IOVCC or GND
22	DOTCLK	I	Data clock signal for RGB interface operation
23	DE	I	Data enable signal for RGB interface operation
24	HSYNC	I	Line sync signal
25	VSYNC	I	Frame sync signal
26	RD	I	8080-I/8080-II system: serves as a read signal and read data at the rising edge.
27	WR(D/C)	I	8080-I/8080-II system: serves as a write signal and write data at the rising edge. 4-line system:serves as Data or Command select. In serial interface "2-data-lane data" transfers mode, serves as a second data pin
28	DC(SCL)	I	DC: This pin is used to select "Data or Command" in the parallel interface SCL: Serial data clock in serial bus system
29	CS	I	Chip select signal
30	RESET	I	System Reset
31-34	IM0-IM3	I	System interface select.
35	NC	-	No connection
36	GND	P	Ground.
37	VCI	P	Power supply
38	VPP_OTP	P	No connection
39	LED-A	P	LED back light(Anode)
40	LED-K	P	LED back light(Cathode)

IM3	IM2	IM1	IM0	Interface	DB Pin in use	
					Register/Content	GRAM
0	0	0	0	80 MCU 8-bit bus interface I	DB[7:0]	DB[7:0]
0	0	0	1	80 MCU 16-bit bus interface I	DB[7:0]	DB[15:0]
0	0	1	0	80 MCU 9-bit bus interface I	DB[7:0]	DB[8:0]
0	0	1	1	80 MCU 18-bit bus interface I	DB[7:0]	DB[17:0]
0	1	0	1	3-line 9-bit data serial interface I	SDA: In/Out	
0	1	1	0	4-line 8-bit data serial interface I	SDA: In/Out	
1	0	0	0	80 MCU 16-bit bus interface II	DB[8:1]	DB[17:10] DB[8:1]
1	0	0	1	80 MCU 8-bit bus interface II	DB[17:10]	DB[17:10]
1	0	1	0	80 MCU 18-bit bus interface II	DB[8:1]	DB[17:0]
1	0	1	1	80 MCU 9-bit bus interface II	DB[17:10]	DB[17:9]
1	1	0	1	3-line 9-bit data serial interface II	SDI: In, SDO: Out	
1	1	1	0	4-line 8-bit data serial interface II	SDI: In, SDO: Out	

6. Absolute maximum Ratings

6.1 Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Note
Power Supply Voltage	VCI	-0.3	3.6	V	1,2

Note:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. $V_{CI}>V_{SS}$ must be maintained.

6.2 Environment Conditions

Item	Symbol	MIN	MAX	Unit	Note
Operating Temperature	TOPR	-20	70	℃	1,2,3
Storage Temperature	TSTG	-30	80	℃	

Note:

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.

   The phenomenon is reversible.

3. Ta<=40℃:85%RH MAX.

Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

7 Electrical Specifications

7.1 Electrical characteristics

GND=0V, Ta=25℃

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VCI	Ta=25℃	2.6	2.8	3.3	V	
Input voltage	'H'	V_{IH}	V_{CI}=2.8V	$0.8V_{CI}$	-	V_{CI}	V	
	'L'	V_{IL}	V_{CI}=2.8V	0	-	$0.2V_{CI}$	V	
Current Consumption		I_{CC1}	Normal mode	-	7	12	mA	1
		I_{CC2}	Sleep mode	-	0.05	0.1	mA	1

Note: Tested in 1×1 chessboard pattern.

7.2 LED Backlight   Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	60	-	mA	
Forward Voltage	VF	-	3.0	-	V	
LED life time	--	-	20,000	--	Hrs	Note

Note : The "LED life time" is defined as the module brightness decrease to 50% original   brightness at Ta=25℃ and IL =60mA. The LED lifetime could be decreased if operating IL is lager than60mA.

8. Optical Specification

Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	300	500	-		Note1 Note2
Response Time		Tr	25℃	-	10	-	ms	Note1 Note3
		Tf			10	-	ms	
View Angles		θT	CR≧10	-	80	-	Degree	Note 4
		θB		-	80	-		
		θL		-	80	-		
		θR		-	80	-		
Chromaticity	White	x	Brightness is on	0.23	0.28	0.33		Note5, Note1
		y		0.28	0.33	0.38		
	Red	x		0.46	0.51	0.56		
		y		0.29	0.34	0.39		
	Green	x		0.26	0.31	0.36		
		y		0.51	0.56	0.56		
	Blue	x		0.10	0.15	0.20		
		y		0.09	0.14	0.19		
NTSC		S		50	60	--	%	Note5
Luminance		L		170	220	--	cd/m^2	Note1 Note6
Uniformity		U		--	80	--	%	Note1 Note7

Note 1:Definition of optical measurement system.

Temperature = 25℃(±3℃);   LED back-light: ON, Environment brightness < 150 lx
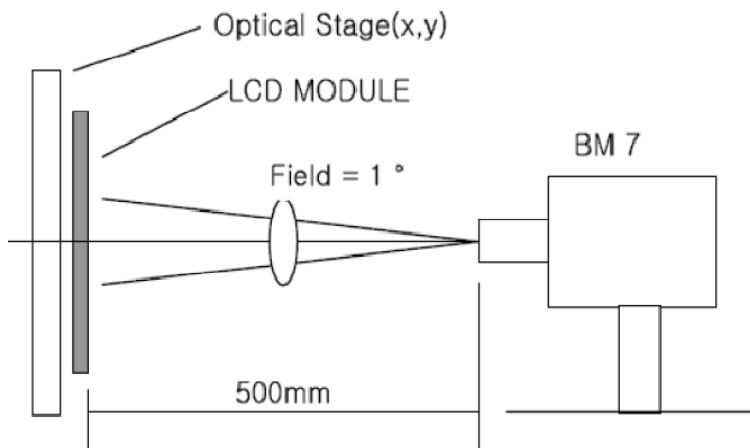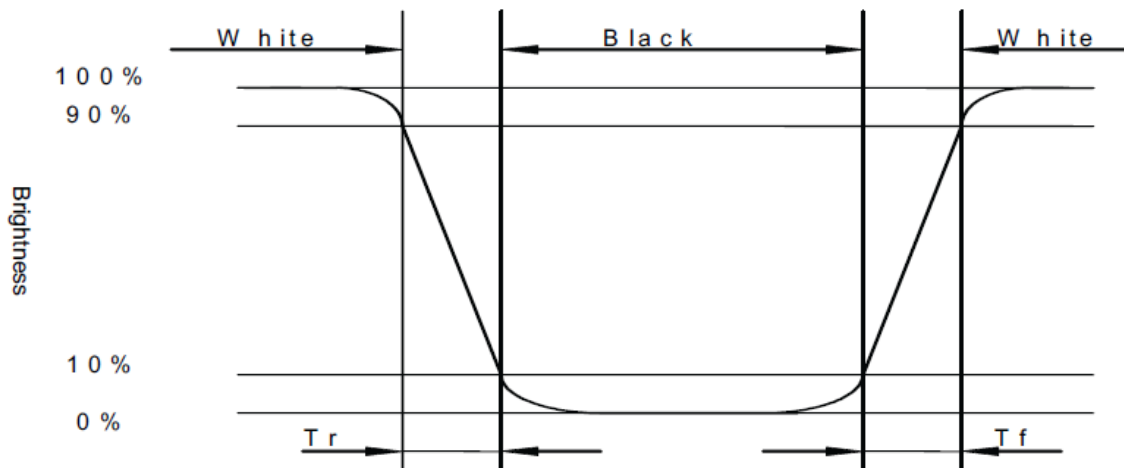
Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$
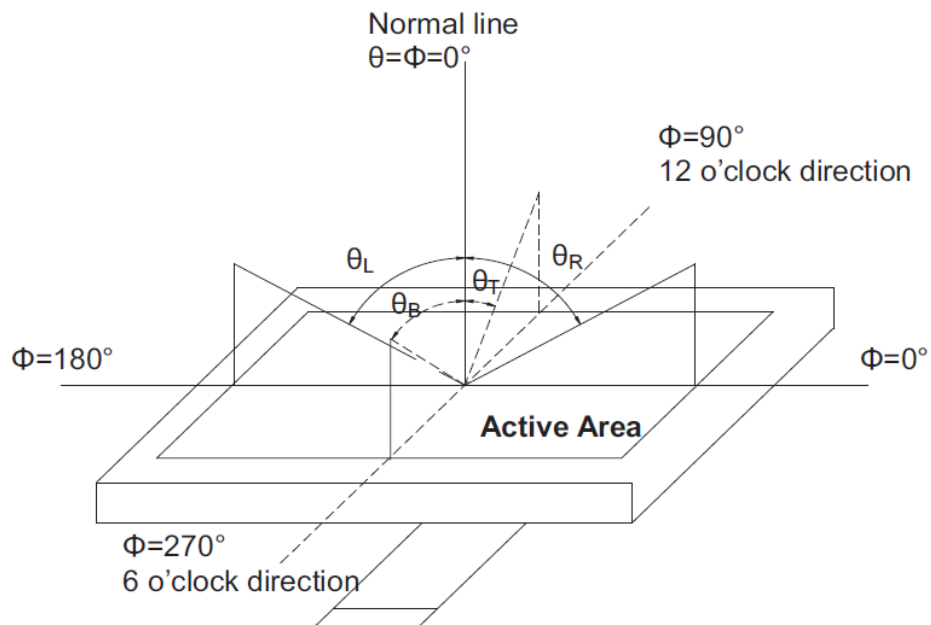
Note 3: Response time is defined as follow:

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).
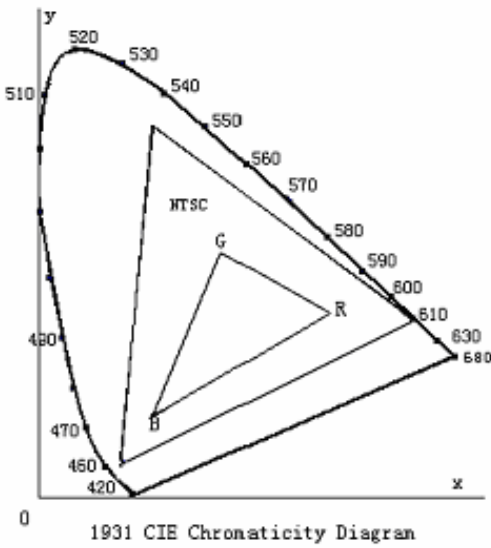

Note 4: Viewing angle range is defined as follow:

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.

1931 CIE Chromaticity Diagram

$$S = \frac{area \ of \ RGB \ triangle}{area \ of \ NTSC \ triangle} \times 100\%$$

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). Everymeasuring point is placed at the center of each measuring area.

$$\text{Uniformity (U)} = \frac{Minimum \ Luminance(\ brightness\ ) \ in \ 9 \ points}{Maximum \ Luminance(\ brightness\ ) \ in \ 9 \ points}$$
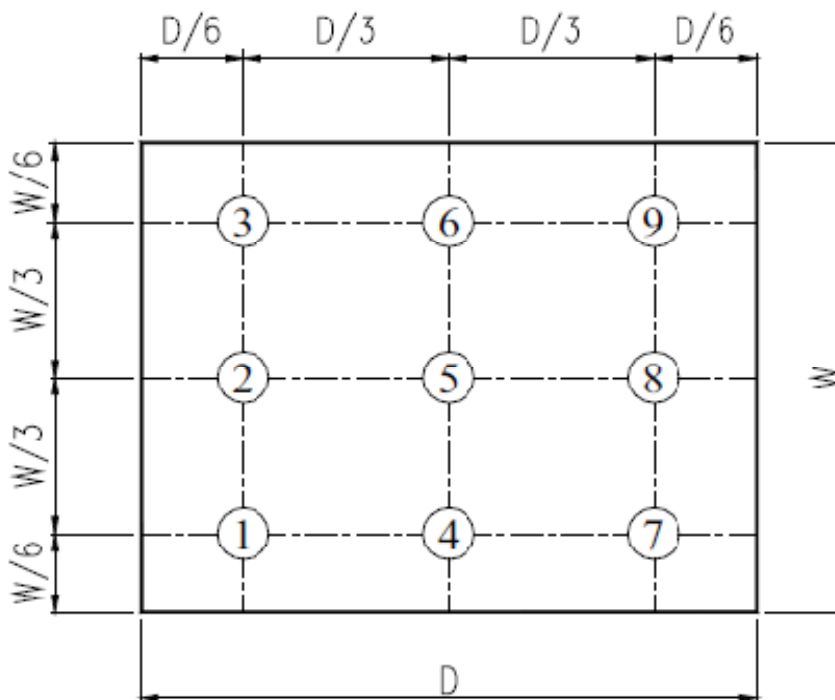
Fig. 2 Definition of uniformity

9. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High TempOperation	Ts=+70℃, 96hrs	Per table in below
2	Low Temp Operation	Ta=-20℃, 96hrs	Per table in below
3	High Temp Storage	Ta=+80℃, 96hrs	Per table in below
4	Low Temp Storage	Ta=-30℃, 96hrs	Per table in below
5	High Temp & High HumidityStorage	Ta=+60℃, 90% RH 96 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 5 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)	10Hz~150Hz, 100m/s2, 120min	Per table in below
9	Shock (Non-operation)	Half- sine wave,300m/s2,11ms	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

10. Precautions for Use of LCD Modules

10.1 Safety

The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystaltouches your skin or clothes, wash it off immediately using soap and water.

10.2 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.

10.3 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.

10.4 Storage

A. Store the products in a dark place at $+25℃\pm10℃$ 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.

10.5 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.

10.6 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 touchpanel and tail. A gap must be made to absorb the tolerance in the case and connector.