

DLC Display Co., Limited

德爾西顯示器有限公司



MODEL No: DLC0550BZG

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Record of Revision

Date	Revision No.	Summary
2016-06-09	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of DLC0550BZG active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 5.5" display area contains 720(RGB) x1280 pixels.

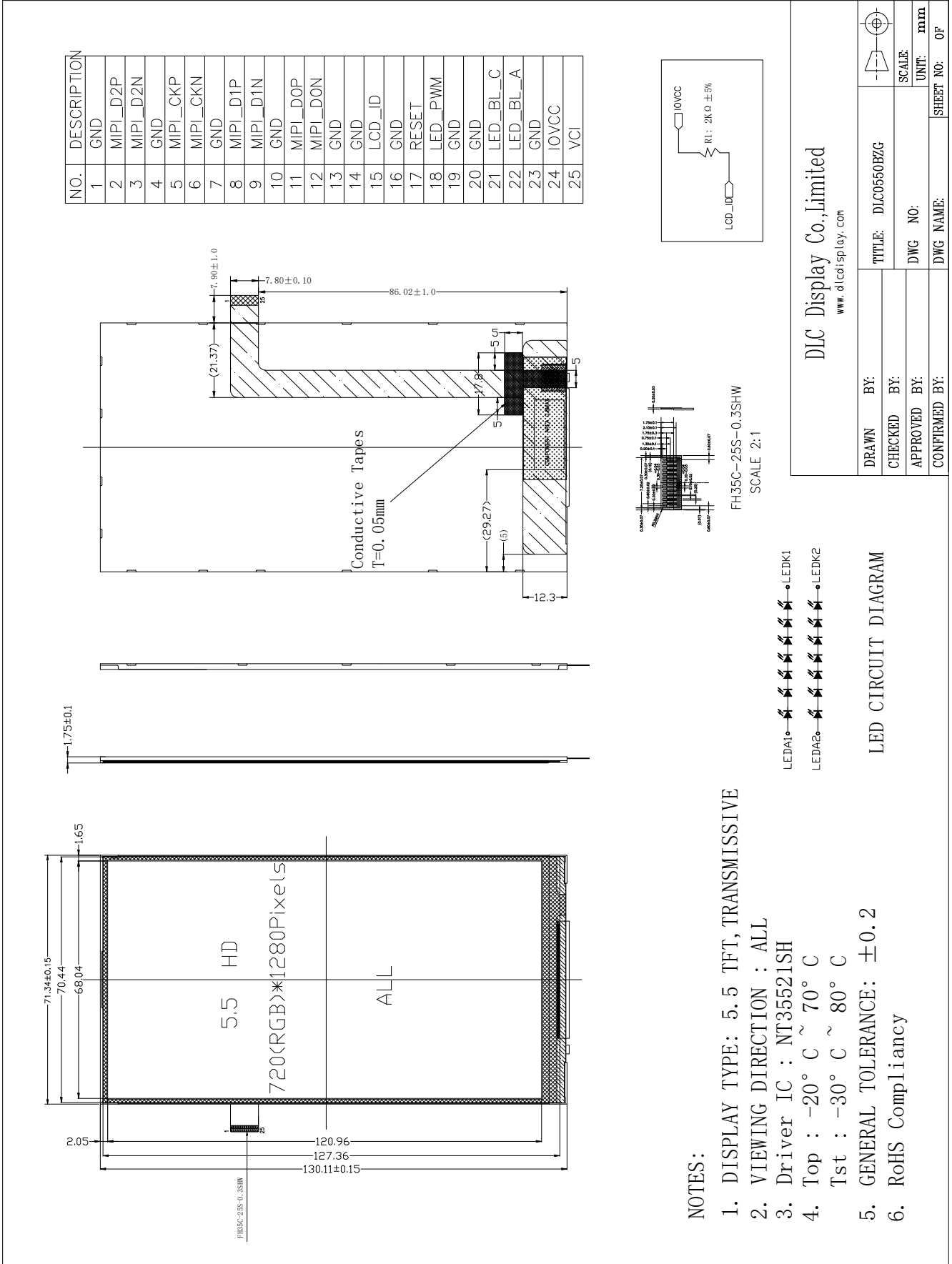
2. Application

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

3. General Information

Item	Contents	Unit
Size	5.5	inch
Resolution	720(RGB) x 1280	/
Technology type	IPS	/
Viewing Direction	All	/
Interface	MIPI	
Pixel pitch (W x H)	/	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	71.34 x 130.11 x 1.75	mm
Active Area(W x H)	68.04 x 120.96	mm
DRIVER IC	NT35521SH	/
Display Mode	Transmissive	/
Backlight Type	LED	/
Weight	TBD	g

4. Outline Drawing



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DRAWN BY:	TITLE: DLC0550BZG	SCALE:	mm
CHECKED BY:	DWG NO:	UNIT:	mm
APPROVED BY:	DWG NAME:	SHEET NO:	OF
CONFIRMED BY:			

5. Interface signals

Pin No.	Symbol	I/O	Function	Remark
1	GND	I	Ground	
2	MIPI_D2P	I/O	DSI-D2+ clock signals	
3	MIPI_D2N	I/O	DSI-D2- clock signals	
4	GND	I	Ground	
5	MIPI_CKP	I/O	DSI-CLK+ clock signals	
6	MIPI_CKN	I/O	DSI-CLK- clock signals	
7	GND	I	Ground	
8	MIPI_D1P	I/O	DSI-D1+ clock signals	
9	MIPI_D1N	I/O	DSI-D1- clock signals	
10	GND	I	Ground	
11	MIPI_D0P	I/O	DSI-D0+ clock signals	
12	MIPI_D0N	I/O	DSI-D0- clock signals	
13	GND	I	Ground	
14	GND	I	Ground	
15	LCD_ID	I	/	
16	GND	I	Ground	
17	RESET	I	LCM Reset input signal	
18	LED_PWM	I	This pin is connected to the external LED driver	
19	GND	I	Ground	
20	GND	I	Ground	
21	LCD_BL_C	I	LED Anode	
22	LCD_BL_A	I	LED Anode	
23	GND	I	Ground	
24	IOVCC	I	Power Supply 1.8V-2.8V	
25	VCI	I	Power Supply 2.8V	

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	

Notes:

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. VDD > V_{SS} must be maintained.

6.2. Environment Conditions

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

Notes:

Background color changes slightly depending on ambient temperature. This Phenomenon is reversible.

Ta ≤ 70°C: 75%RH max

Ta > 70°C: absolute humidity must be lower than the humidity of 75%RH at 70°C

Ta at -30°C will be <48hrs, at 80 °C will be <120hrs

7. Electrical Specifications

7.1 Electrical characteristics

GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Operating voltage	VDD	2.6	2.8	3.3	V	
Supply current	IDD	-	-	5	mA	VDD=2.8V, Ta=25°C
Input voltage	VIL	0	--	0.2VDD	V	
	VIH	0.8VDD	--	VDD	V	
Input leakage current	I _{IL}	-1.0	-	1.0	uA	VIN=VDD or VSS

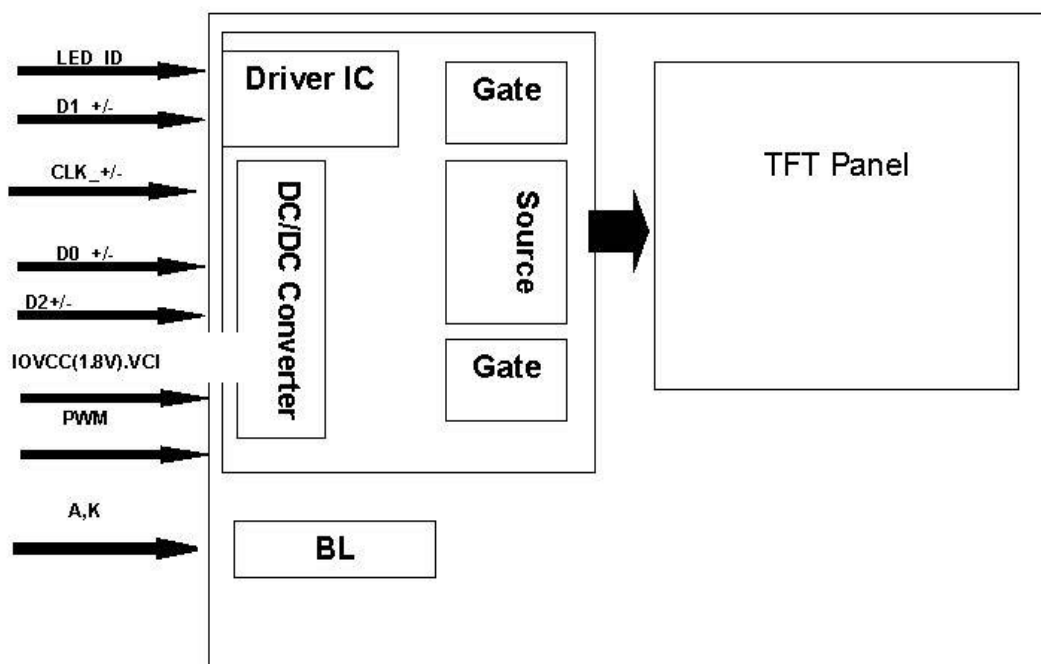
Note: Voltage greater than above may damage the module.

All voltages are specified relative to VSS=0V.

7.2 LED Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	--	40	--	mA	
Forward Voltage	VF	--	22.4	--	V	
Life time	--	--	25,000	--	Hr	

7.3 BLOCK DIAGRAM



8. AC CHARACTERISTICS

Interface: System Bus Read/Write Characteristics

VSS = VSSI = DVSS = 0V, VDDI = 1.65V to 3.3 V, VDD = 2.3V to 4.8V, Ta = -30 to 70°C

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
Low Power Mode to High Speed Mode Timing							
DSI-Dn+/-	TLPX	Length of any low power state period	50	-	-	ns	Input
DSI-Dn+/-	THS-PREPREPARE	Time to drive LP-00 to prepare for HS transmission	40+4xUI	-	85+6xUI	ns	Input
DSI-Dn+/-	THS-TERMINEN	Time to enable data receiver line termination measured from when Dn crosses VILMAX	-	-	35+4xUI	ns	Input
High Speed Mode to Low Power Mode Timing							
DSI-Dn+/-	THS-SKIP	Time-out at display module to ignore transition period of EoT	40	-	55+4xUI	ns	Input
DSI-Dn+/-	THS-EXIT	Time to drive LP-11 after HS burst	100	-	-	ns	Input
DSI-Dn+/-	THS-TRAIL	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60+4xUI	-	-	ns	Input
High Speed Mode to/from Low Power Mode Timing							
DSI-CLK+/-	TCLK-POS	Time that the MPU shall continue sending HS clock after the last associated data lane has transition to LP mode	60+52xUI	-	-	ns	Input
DSI-CLK+/-	TCLK-TRAIL	Time to drive HS differential state after last payload clock bit of a HS transmission burst	60	-	-	ns	Input
DSI-CLK+/-	THS-EXIT	Time to drive LP-11 after HS burst	100	-	-	ns	Input



DSI-CLK+/-	TCLK-PREP ARE	Time to drive LP-00 to prepare for HS transmission	38	-	95	ns	Input
DSI-CLK+/-	TCLK-TERM -EN	Time-out at clock lane display module to enable HS transmission	-	-	38	ns	Input
DSI-CLK+/-	TCLK-PREP ARE + TCLK-ZERO	Minimum lead HS-0 drive period before starting clock	300	-	-	ns	Input
DSI-CLK+/-	TCLK-PRE	Time that the HS clock shall be driven prior to any associated data lane beginning the transition from LP to HS mode	8xUI	-	-	ns	Input

Note 1) Dn = D0, D1, D2 and D3.

Note 2) Two HS transmission can be sent with a break as short as THS-EXIT from each other in continuous clock mode. In discontinuous mode, the break is longer which account TCLK-POS, TCLK-TRAIL and THS-EXIT, before activity in clock and data lanes again.

9. Optical Specification

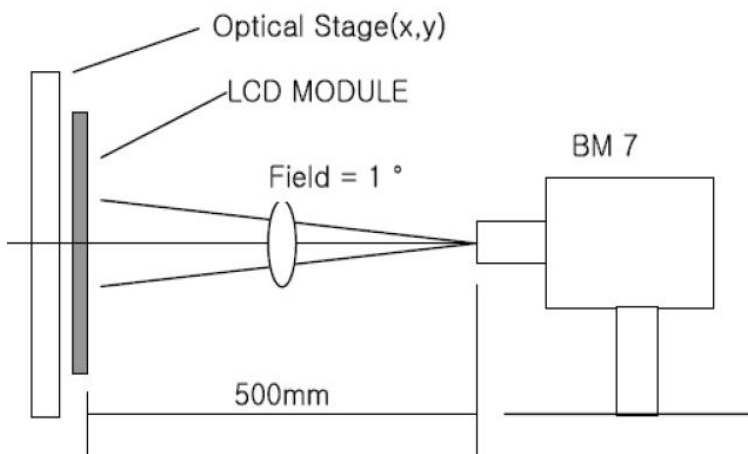
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	500	700	-		Note1 Note2
Response Time	Tr+ Tf	25°C	-	25	-	ms	Note1 Note3
View Angles	ΘT	$CR \geq 10$	80	-	-	Degree	Note 4
	ΘB		80	-	-		
	ΘL		80	-	-		
	ΘR		80	-	-		
Chromaticity	White	x	Brightness is on	Typ-0.05	TBD	Typ+0.05	Note5, Note1
		y			TBD		
	Red	x			TBD		
		y			TBD		
	Green	x			TBD		
		y			TBD		
	Blue	x			TBD		
		y			TBD		
Luminance	L		-	440	-	cd/m ²	Note1 Note6
Uniformity	U		75	80	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

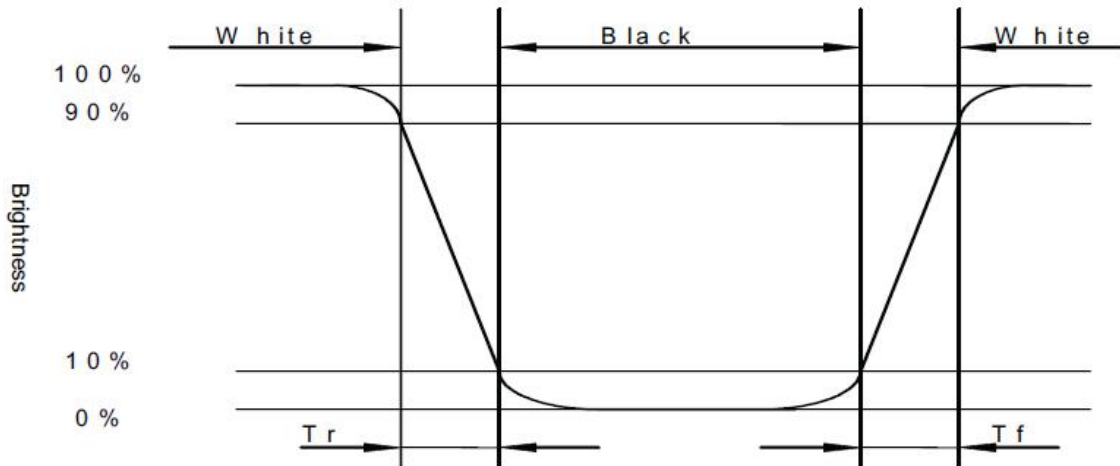


Note 2: Contrast ratio is defined as follow:

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

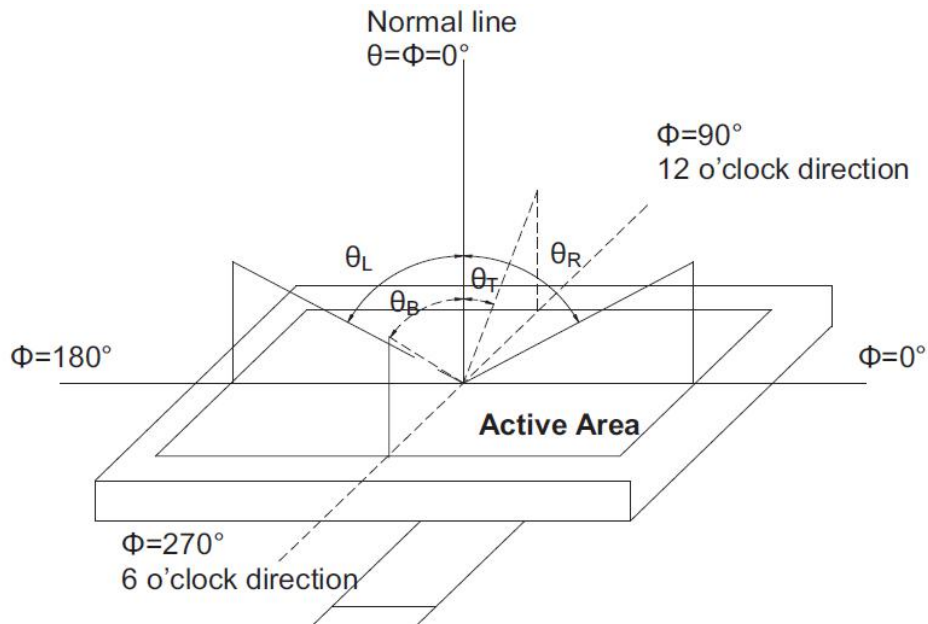
Note 3: Response time is defined as follow:

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).



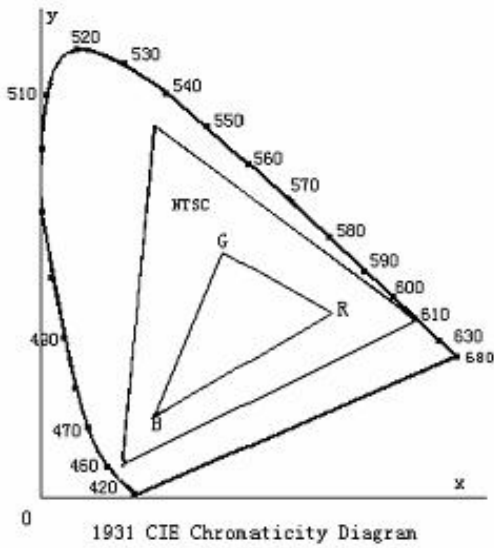
Note 4: Viewing angle range is defined as follow:

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.

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

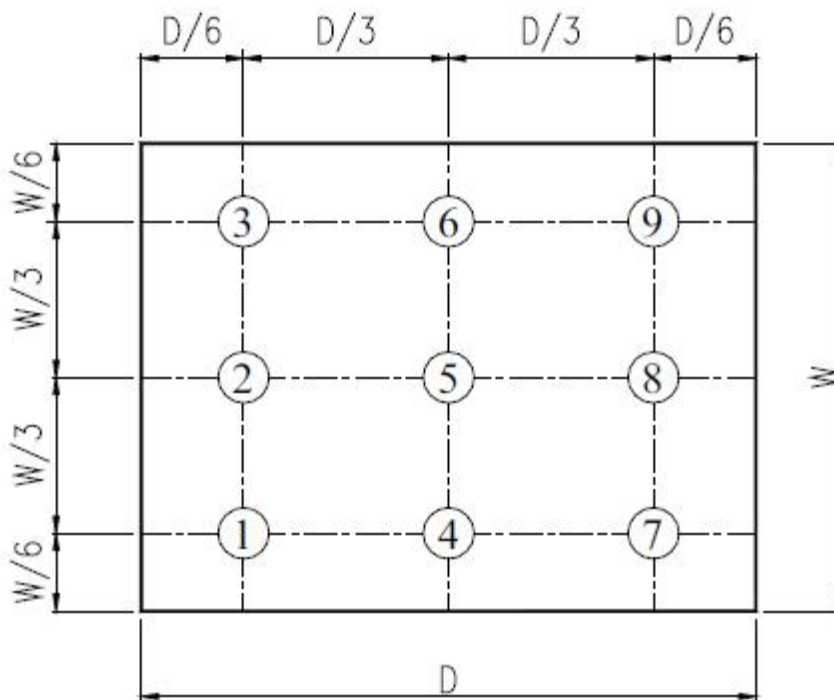


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70°C, 120 hrs	Per table in below
2	Low Temp Operation	Ta=-20°C, 120 hrs	Per table in below
3	High Temp Storage	Ta=+80°C, 120 hrs	Per table in below
4	Low Temp Storage	Ta=-30°C, 120 hrs	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~+70°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)	10Hz~150Hz, 100m/s ² , 120min	Per table in below
9	Shock (Non-operation)	Half- sine wave,300m/s ² ,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

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.

