

**DLC Display Co., Limited**

德爾西顯示器有限公司



MODEL No: DLC0430LZR-T-41

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### Record of Revision

Date	Revision No.	Summary
2016-09-19	1.0	Rev 1.0 was issued

### 1. Scope

This data sheet is to introduce the specification of DLC0430LZR-T-41 active matrix TFT module. It is composed of a color TFT-LCD panel, driver IC, FPC, touch panel and a backlight unit. The 4.3" display area contains 480 (RGB) x 272 pixels.

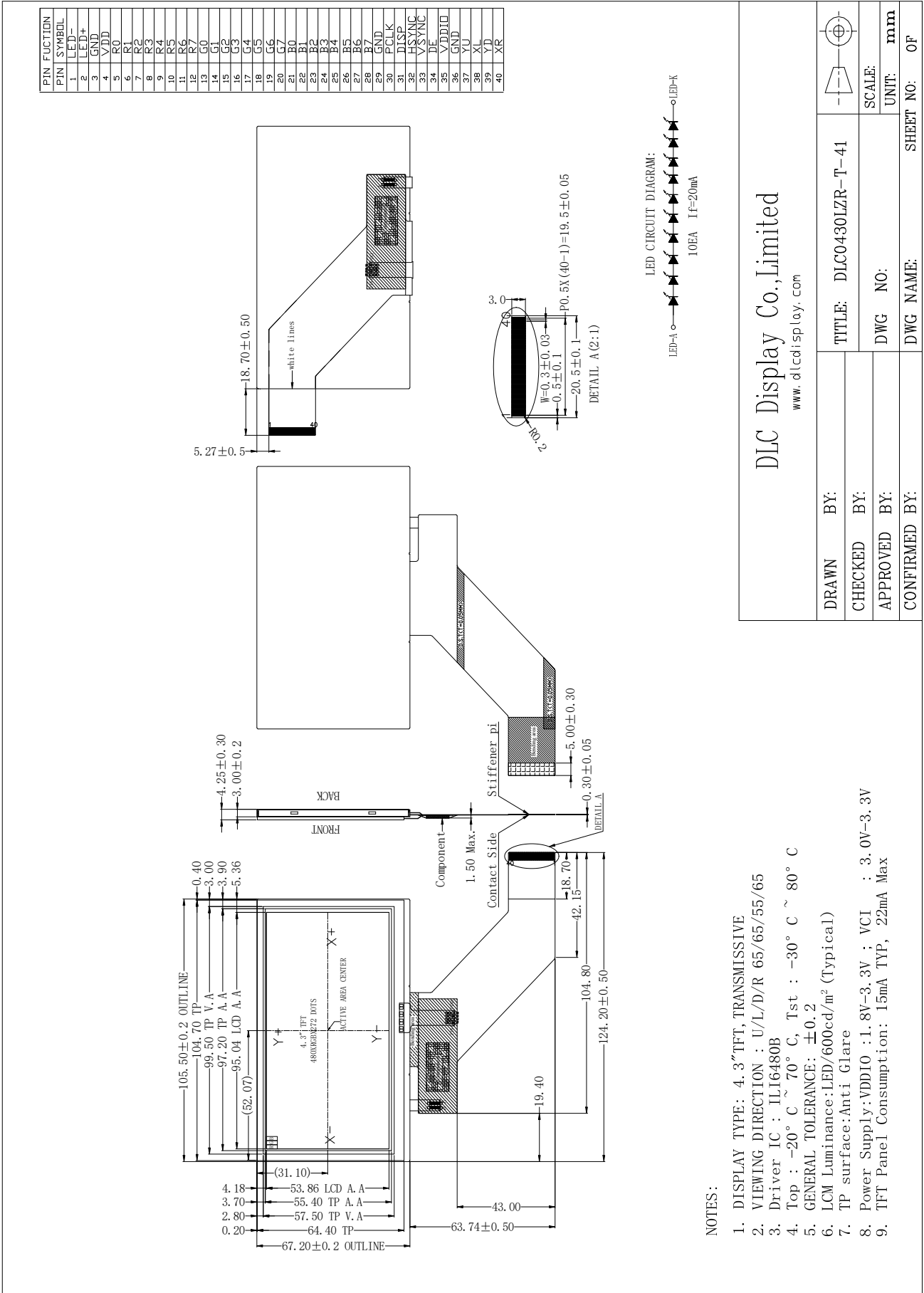
### 2. Application

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

### 3. General Information

Item	Contents	Unit
Size	4.3	inch
Resolution	480 (RGB) x 272	/
Interface	RGB	/
Technology type	a-Si TFT	/
Pixel pitch	0.198 x 0.198	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	105.50 x 67.20 x 4.25	mm
Active Area	95.04 x 53.86	mm
Display Mode	Transmissive Normally White	/
Driver IC of CTP	ILI6480B	
Backlight Type	LED	/
Weight	TBD	g

### 4. LCM Outline Drawing



5. Interface signals

No.	Symbol	I/O	Description
1	VLED-	P	LED back light (Cathode)
2	VLED+	P	LED back light (Anode)
3	GND	P	Ground
4	VDD	P	Power supply
5-12	R0~R7	I	Red data bus
13-20	G0~G7	I	Green data bus
21-28	B0~B7	I	Blue data bus
29	GND	P	Ground
30	PCLK	I	Data clock
31	DISP	I	Normal display and Standby mode select pin
32	HSYNC	I	Line sync signal
33	VSYNC	I	Frame sync signal
34	DE	I	Data enable pin
35	VDDIO	P	Power supply for logic
36	GND	P	Ground
37	YU	O	Touch Panel Control pin
38	XL	O	
39	YD	O	
40	XR	O	

## 6. Absolute maximum Ratings

### 6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	Vcc	-0.3	3.6	V	
Logic Signal Input /Output Voltage	V <sub>Iovcc</sub>	-0.3	Vcc+0.5	V	

Notes:

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.

### 6.2. Environment Conditions

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

Notes:

- The response time will become lower when operated at low temperature.
- Background color changes slightly depending on ambient temperature.  
The phenomenon is reversible.
- Ta<=40°C:85%RH MAX.  
Ta>=40°C:Absolute humidity must be lower than the humidity of 85%RH at 40°C.

### 6.3. LED Backlight Absolute max. ratings

Item	Symbol	MIN	MAX	Unit	Remark
LED Forward Current	I <sub>LED</sub>	--	25	mA	

## 7. Electrical Specifications

### 7.1 Electrical characteristics

GND=0V, Ta=25°C

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VCC	Ta=25°C	3.0	3.3	3.6	V	
Input voltage	'H'	VIH	VCC=3.3V	0.8VCC	-	VCC	V
	'L'	VIL	VCC=3.3V	0	-	0.2VCC	V
Current Consumption	ICC1	Normal mode	-	15	30	mA	1
	ICC2	Sleep mode	-	0.05	0.1	mA	1
Clock Frequency	fCLK	-	-	9	12	MHz	

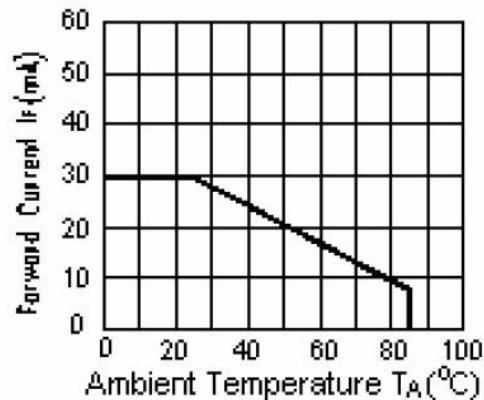
Note: 1: Tested in 1×1 chessboard pattern.

### 7.2 LED Backlight

Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	--	20	--	mA	
Forward Voltage	VF	--	30	--	V	If=20mA
LED life time	--	--	20,000	--	Hr	

Note:



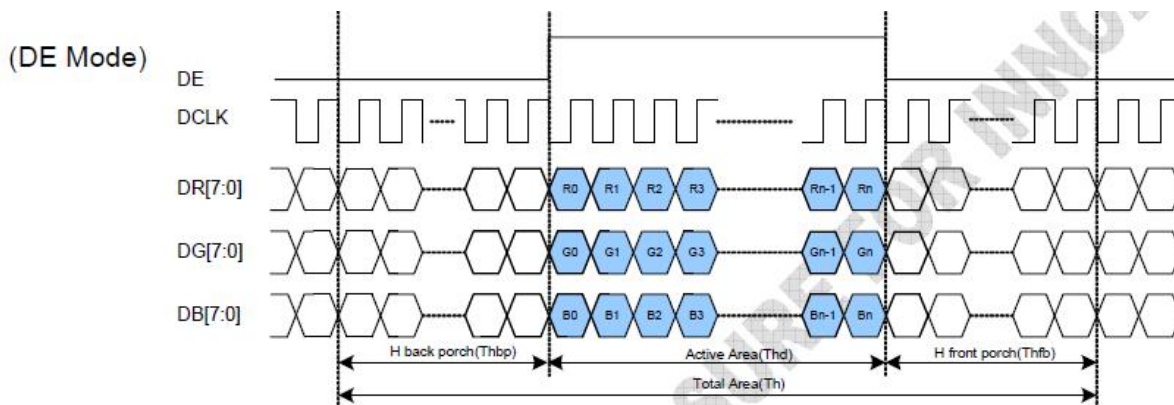
CIRCUIT DIAGRAM

## 8. Command/AC Timing

### Parallel RGB Input Timing Table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	5	9	12	MHz
VSD period time	Tv	277	288	400	H
VSD display area	Tvd	272			H
VSD back porch	Tvb	3	8	31	H
VSD front porch	Tvfp	2	8	97	H
HSD period time	Th	520	525	800	DCLK
HSD display area	Thd	480			DCLK
HSD back porch	Thbp	36	40	255	DCLK
HSD front porch	Thfp	4	5	65	DCLK

### SYNC-DE Mode Timing Diagram





## 9. Optical Specification

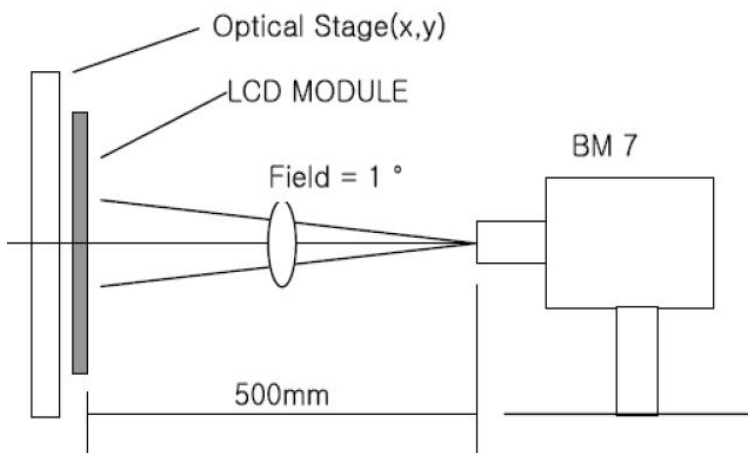
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	300	500	-		Note1 Note2
Response Time	Ton	25°C	-	10	-	ms	Note1
	Toff		-	10	-	ms	Note3
View Angles	$\Theta T$	$CR \geq 10$	-	65	-	Degree	Note 4
	$\Theta B$		-	55	-		
	$\Theta L$		-	65	-		
	$\Theta R$		-	65	-		
Chromaticity	White	Brightness is on	x	0.28	-	Note5, Note1	
			y	0.33	-		
	Red		x	0.51	-		
			y	0.34	-		
	Green		x	0.31	-		
			y	0.56	-		
	Blue		x	0.15	-		
			y	0.14	-		
NTSC	S		50	60		%	Note5
Luminance	L		-	600	-	cd/m <sup>2</sup>	Note1 Note6
Uniformity	U		80	-	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

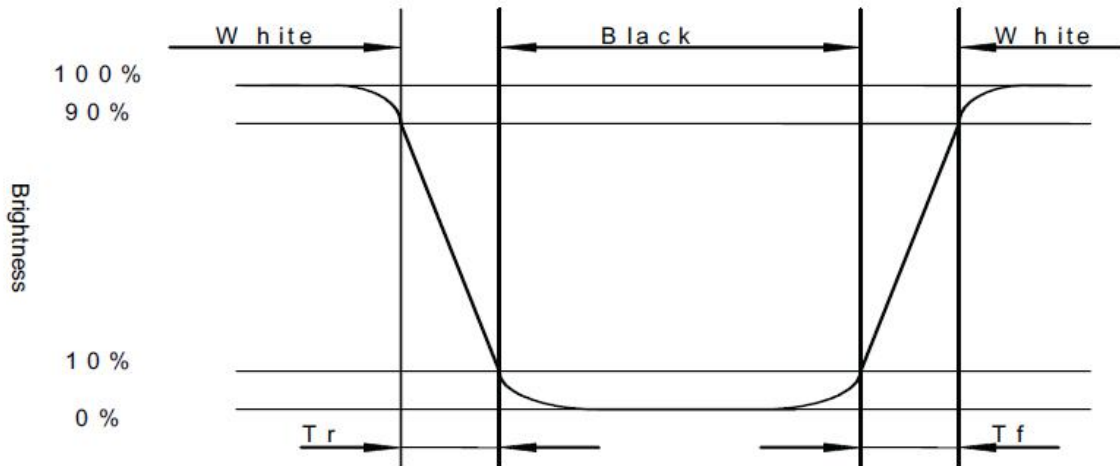


Note 2: Contrast ratio is defined as follow:

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

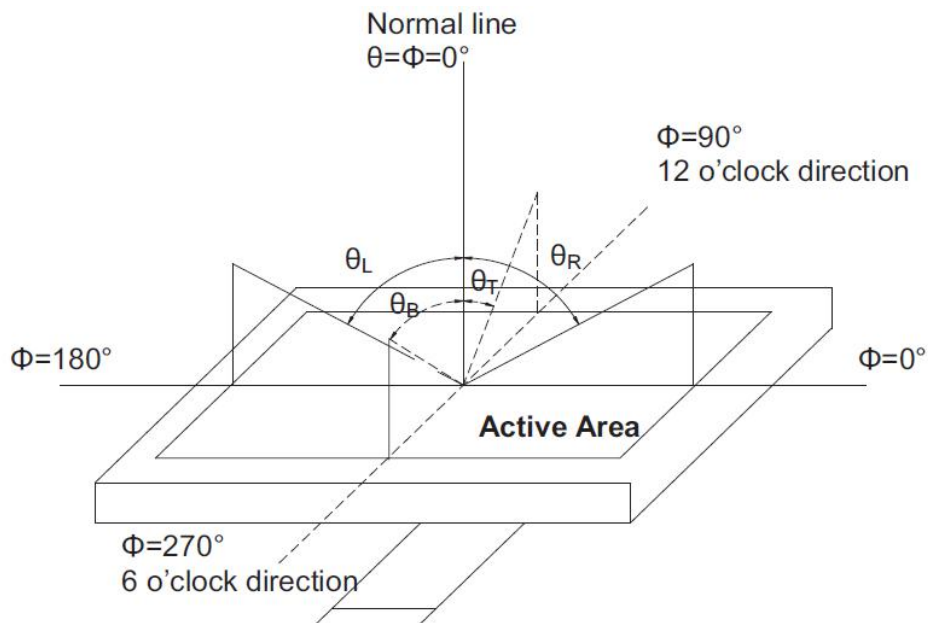
Note 3: Response time is defined as follow:

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,  $T_f$ ).



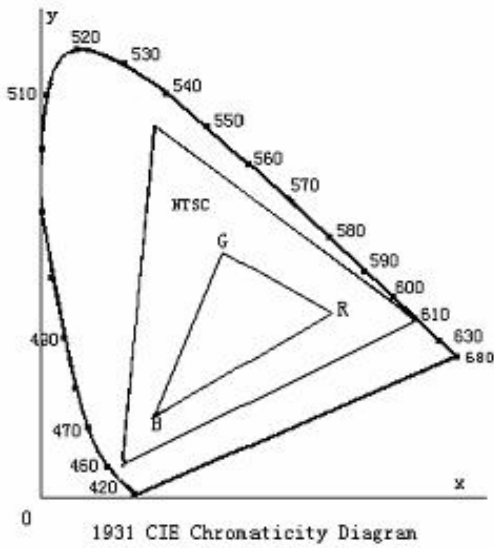
Note 4: Viewing angle range is defined as follow:

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.

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

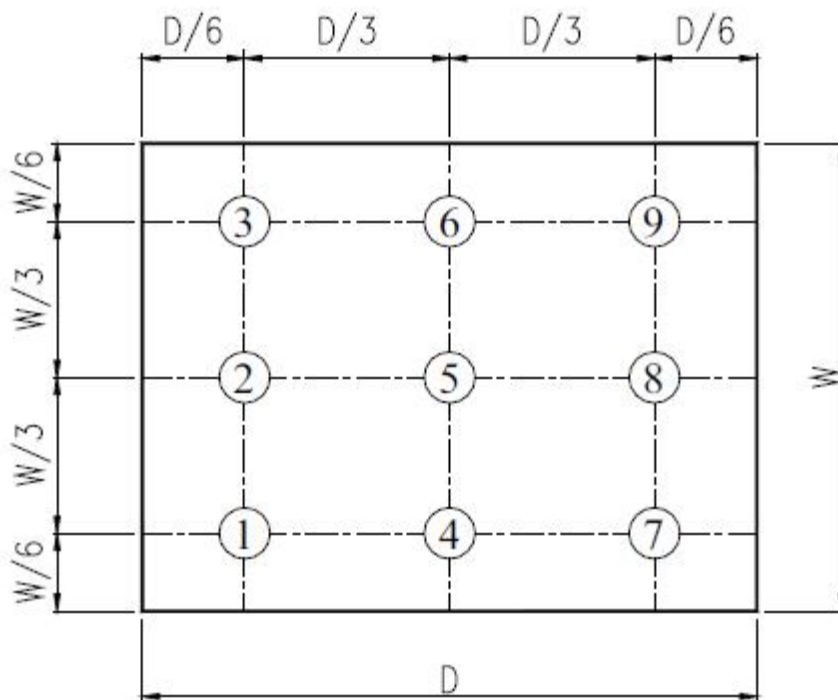


Fig. 2 Definition of uniformity

## 10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70°C, 96hrs	Per table in below
2	Low Temp Operation	Ta=-20°C, 96hrs	Per table in below
3	High Temp Storage	Ta=+80°C, 96hrs	Per table in below
4	Low Temp Storage	Ta=-30°C, 96hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60°C, 90% RH 96 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, 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)	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.

