Microtips

T E C H N O L O G Y

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Record of Revision

Date	Revision No.	Summary
2016-03-28	1.0	Rev 1.0 was issued

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1. Scope

   This data sheet is to introduce the specification of **MTD0784AZL** active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The 7.84" display area contains 400RGB) x 1280 pixels.
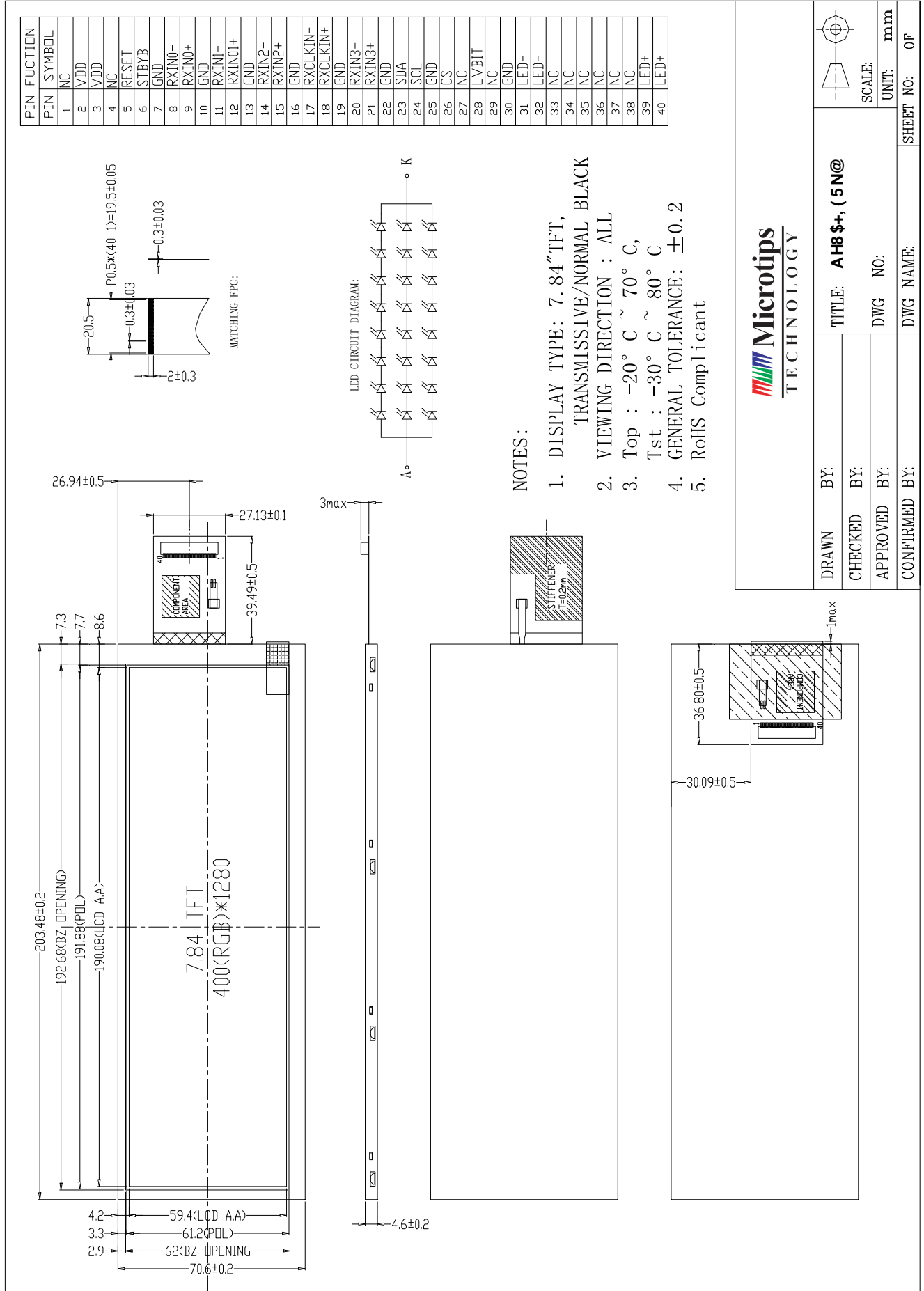
2. Application

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

3. General Information

Item	Contents	Unit
Size	7.84	inch
Resolution	400(RGB) x 1280	/
Interface	LVDS	/
Technology type	IPS	/
Pixel Configuration	RGB stripes	
Outline Dimension (W x H x D)	70.60 x 203.48 x 4.60	mm
Active Area	59.40 x 190.08	mm
Display Mode	Transmissive, Normally Black	/
Backlight Type	LED	/
Weight	TBD	g

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4. Outline Drawing

PIN FUCTION

PIN	SYMBOL
1	NC
2	VDD
3	VDD
4	NC
5	RESET
6	STBYB
7	GND
8	RXIN0-
9	RXIN0+
10	GND
11	RXIN1-
12	RXIN01+
13	GND
14	RXIN2-
15	RXIN2+
16	GND
17	RXCLKIN-
18	RXCLKIN+
19	GND
20	RXIN3-
21	RXIN3+
22	SDA
23	SCL
24	GND
25	CS
26	NC
27	LVBIT
28	NC
29	GND
30	LED-
31	LED-
32	NC
33	NC
34	NC
35	NC
36	NC
37	NC
38	NC
39	LED+
40	LED+

MATCHING FPC:

P0.5*(40-1)=19.5±0.05
0.3±0.03
20.5
0.3±0.03
2±0.3

LED CIRCUIT DIAGRAM:

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NOTES:
1. DISPLAY TYPE: 7.84"TFT, TRANSMISSIVE/NORMAL BLACK
2. VIEWING DIRECTION : ALL
3. Top : -20°C ~ 70°C, Tst : -30°C ~ 80°C
4. GENERAL TOLERANCE: ±0.2
5. RoHS Compliant

26.94±0.5
27.13±0.1
39.49±0.5
3max
COMPONENT AREA
7.3
7.7
8.6
203.48±0.2
192.68(BZ OPENING)
191.88(POL)
190.08(LCD AA)

7.84 TFT
400(RGB)*1280

STIFFENER T=0.2mm
4.6±0.2

36.80±0.5
1max
30.09±0.5

4.2
3.3
2.9
59.4(LCD AA)
61.2(POL)
62(BZ OPENING)
70.6±0.2

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TITLE: AH8$+,(5N@
DWG NO:
DWG NAME:

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

SCALE:
UNIT: mm
SHEET NO: OF

5. Interface signals

NO.	SYMBOL	DISCRIPTION	REMARK
1	NC	NC	
2-3	VDD	Power Supply	
4	NC	NC	
5	RESET	Global reset pin	
6	STBYB	Standby mode	
7	GND	Ground	
8	RXIN0-	Data lane0 input	
9	RXIN0+		
10	GND	Ground	
11	RXIN1-	Data lane1 input	
12	RXIN1+		
13	GND	Ground	
14	RXIN2-	Data lane2 input	
15	RXIN2+		
16	GND	Ground	
17	RXCLKIN-	CLK input	
18	RXCLKIN+		
19	GND	Ground	
20	RXIN3-	Data lane 3 input	
21	RXIN3+		
22	GND	Ground	
23	SDA	Serial communication data input.	
24	SCL	Serial communication clock input	
25	GND	Ground	
26	CS	Serial communication enables.	
27	NC	NC	
28	LVBIT	6-bit / 8-bit input select for LVDS mode HSD=" L" :6 bit HSD=" H" :8 bit	
29	NC	NC	
30	GND	Ground	
31-32	LED-	LED Cathode	
33-38	NC	NC	
39-40	LED+	LED Anode	

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6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	Min.	TYP.	Max.	Unit	Remark
Power supply	VCI	-	3.3	-	V	
Gate On Power Supply Voltage	VGH	-	15	-	V	
Gate Off Power Supply Voltage	VGL	-	-11	-	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. VCC >VSS must be maintained.
3. Please be sure users are grounded when handing LCD Module

6.2. Environment Conditions

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

Notes:

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℃

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Power supply		VCI	--	3.3	3.6	V	
Power supply		IOVCC	--	1.8	--	V	
Input voltage	H	V_{IH}	0.8Vdd	--	Vdd	V	Vdd=2.8V
	L	V_{IL}	0	--	0.2Vdd	V	VCC=2.8V

Note:

1:When an optimum contrast is obtained in transmissive mode.

2: Tested in 1╳1 chessboard pattern.

7.2 LED Backlight

Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	90	--	180	mA	VL = 3.2V
Forward Voltage	VF	--	25	--	V	
LED lifetime	--	--	25,000	--	Hr	

Note:

1: VLED=VLED(+)-VLED(-).

2:The current of LED is 30mA.

A LED drive in constant current mode is recommended

CIRCUIT DIAGRAM

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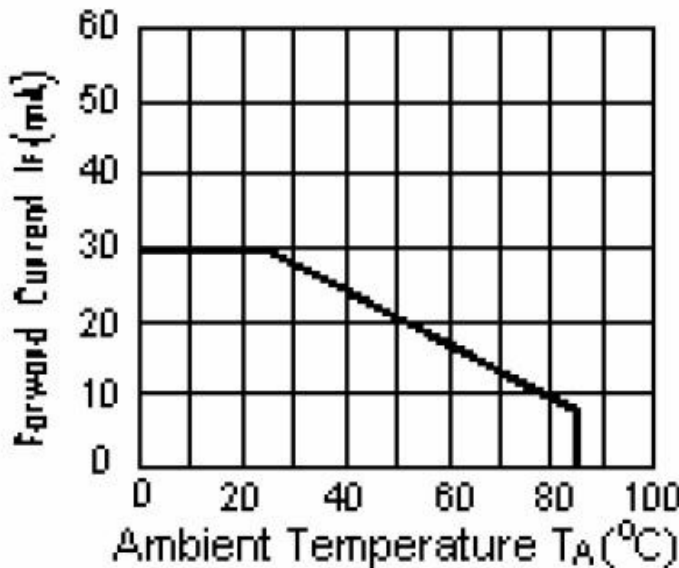
8. Optical Specification

Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	700	900	-		Note1 Note2
Response Time		Tr+ Tf	25℃	-	40	-	ms	Note1 Note3
View Angles		ΘT	CR≧10	-	80	-	Degree	Note 4
		ΘB		-	80	-		
		ΘL		-	80	-		
		θR		-	80	-		
Chromaticity	Red	x	Brightness is on	0.562	0.592	0.622		Note5, Note1
		y		0.289	0.319	0.349		
	Green	x		0.279	0.309	0.339		
		y		0.537	0.567	0.597		
	Blue	x		0.117	0.147	0.194		
		y		0.120	0.150	0.150		
	White	x		0.250	0.280	0.310		
		y		0.290	0.320	0.350		
Luminance		L	If= 90 mA	-	550	-	cd/m^2	Note1 Note6
			If= 120 mA	-	650	-		
			If= 150 mA	-	750	-		
			If= 180 mA	-	850	-		
Uniformity		U		75	80	-	%	Note1 Note7
NTSC Ratio				70			%	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃);   LED back-light: ON, Environment brightness < 150 lx

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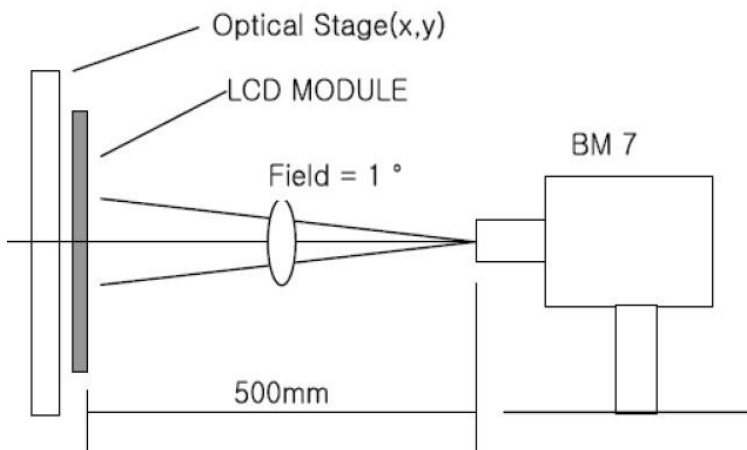
Note 2: Contrast ratio is defined as follow:

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

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).
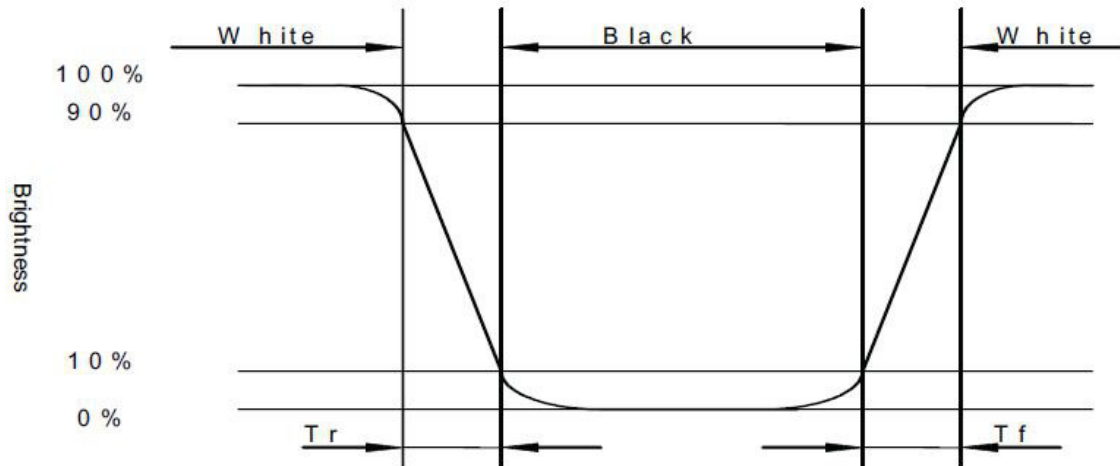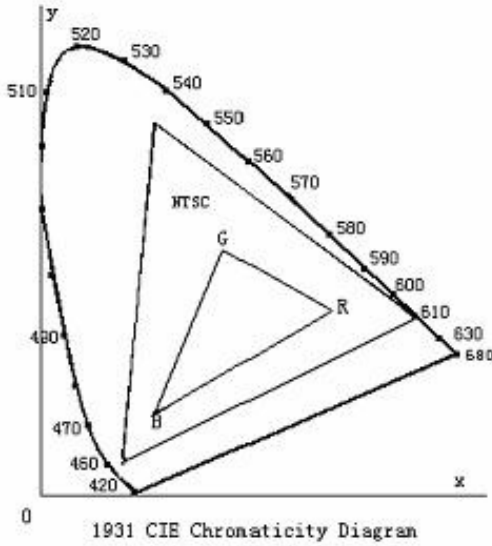
Note 4: Viewing angle range is defined as follow:

   Viewing angle is measured at the center point of the LCD.
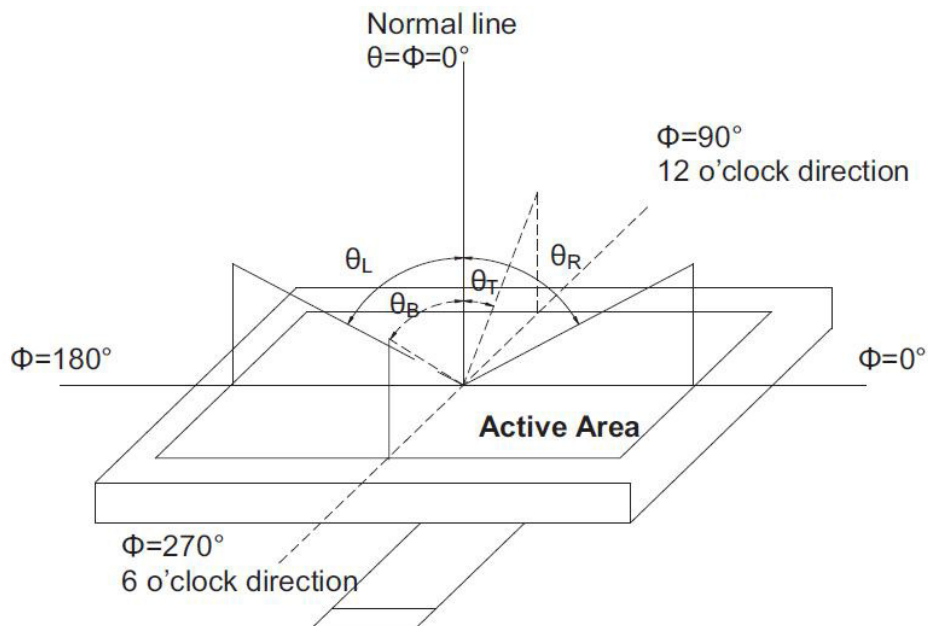
Note 5: Color chromaticity is defined as follow: (CIE1931)

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

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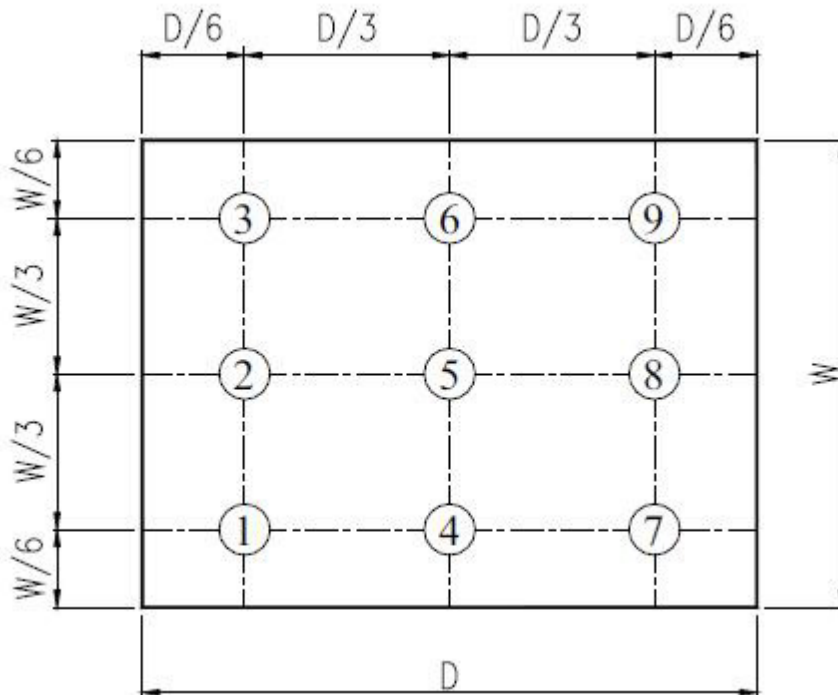
Fig. 2 Definition of uniformity

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9. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	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 Humidity Storage	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 crystal touches 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℃±10℃ 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 touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.
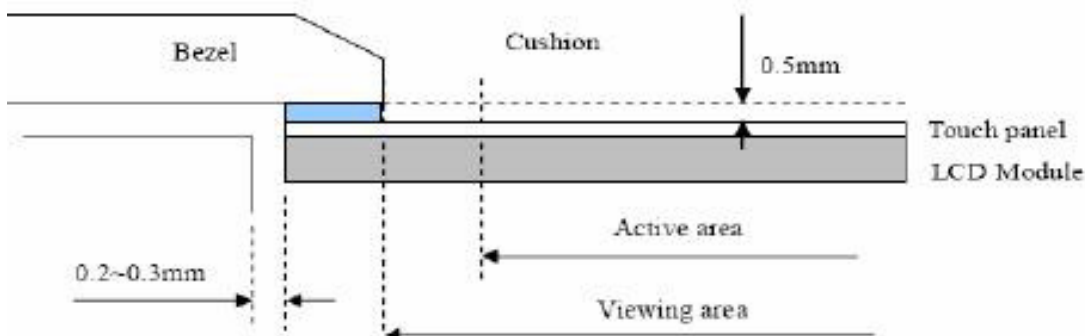
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