



# Microtips Technology

*Innovative Solutions. Your Vision. Our Goal.*

## TFT Module Specification

**MODEL: UC-101ZIEB0HDO-S**

This module uses ROHS material

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED
<div>RD 2024.05.23 趙長慶</div>	<div>PM 2024.05.23 呂家祥</div>	<div>批准 2024.05.23 PM</div>

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## RECORD OF REVISION

Version	Revised Date	Page	Content
V1.0	2024/05/23	--	PRELIMINARY SPEC.

## TABLE OF CONTENTS

No.	Content	Page
	TFT Module Specification .....	1
	TABLE OF CONTENTS .....	3
1.	GENERAL DESCRIPTION .....	4
2.	MECHANICAL SPECIFICATION .....	5
3.	PIN DESCRIPTION .....	6
4.	ABSOLUTE MAXIMUM RATINGS .....	7
5.	BLOCK DIAGRAM .....	8
6.	ELECTRICAL CHARACTERISTICS .....	9
7.	OPTICAL CHARACTERISTICS .....	10
8.	RELIABILITY.....	13
9.	PRECAUTION RELATING PRODUCT HANDLING .....	18

## 1. GENERAL DESCRIPTION

### 1.1 Description

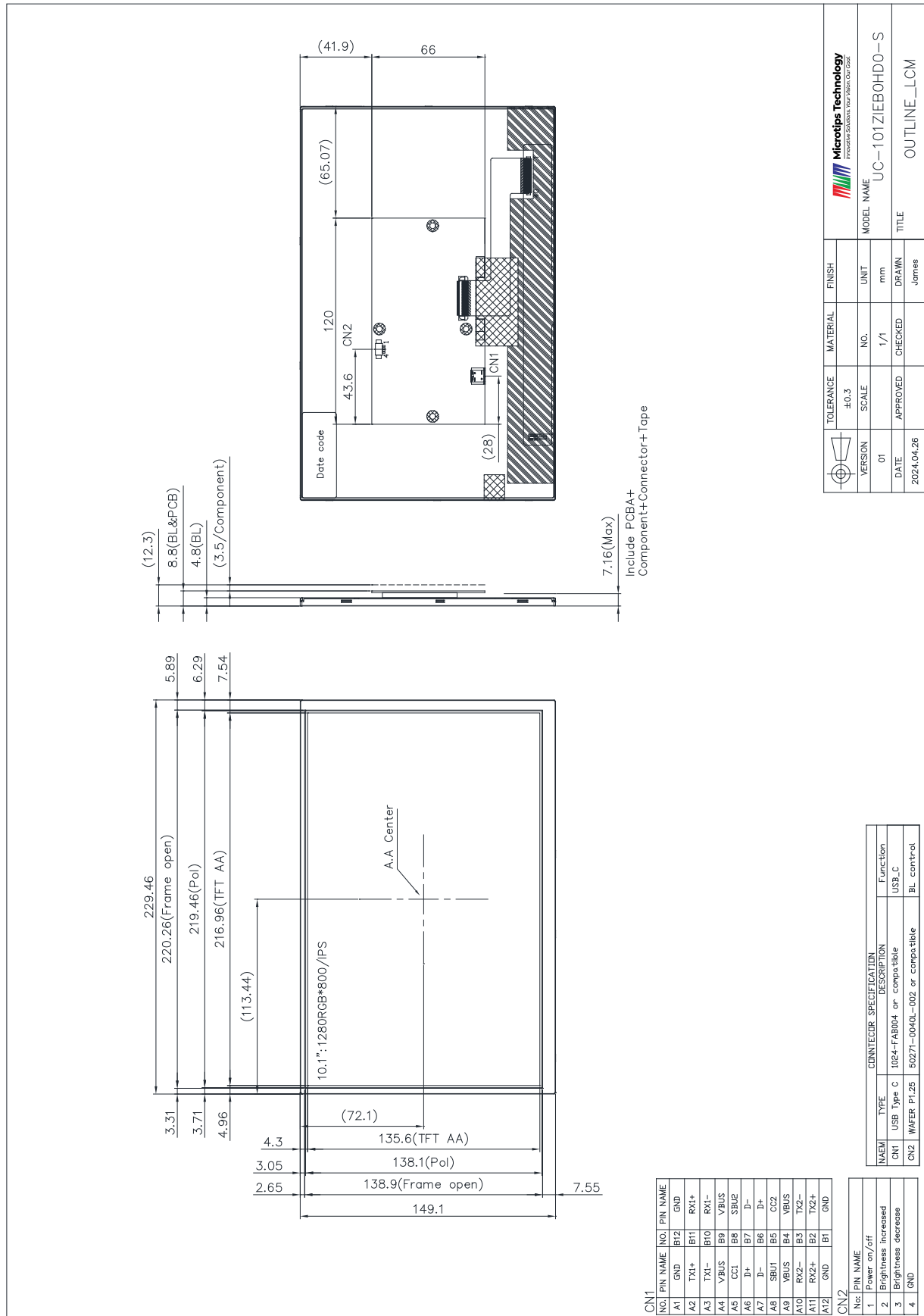
The specification is model UC-101ZIEB0HD0-S is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit, a backlight system. This TFT LCD has a 10.1 (16:10) inch diagonally measured active display area with WXGA (1280 horizontal by 800 vertical pixels) resolution.

- ♦ Supports VESA DisplayPort Alt. Mode 1.0a
- ♦ DisplayPort 1.3
- ♦ Build-in OSD function.

### 1.2 Features:

No.	Item	Specification	Unit
1	Panel Size	10.1"	Inch
2	Number of Pixels	1280 (W) x RGB x 800 (H)	Pixels
3	Active Area	216.96 (W) x 135.6 (H)	mm
4	Pixel Pitch	0.1695 (W) x 0.1695 (H)	mm
5	Outline Dimension	229.46 (W) x 149.1 (H) x 12.3(T)	mm
6	Number of Colors	16.7M	- -
7	Display Mode	IPS / Normally Black / Transmissive	- -
8	Viewing Direction	Free direction	- -
9	Display Format	RGB vertical stripe	- -
10	Surface Treatment	Anti-Glare (3H)	- -
11	Contrast Ratio	900 (Typ.)	- -
12	Luminance (cd/m <sup>2</sup> )	700 (Typ.)	cd/m <sup>2</sup>
13	Interface	TYPE-C (5V/3A)	- -
14	Backlight	White LED	- -
15	Operation Temperature	0 ~ 70	°C
16	Storage Temperature	-30 ~ 80	°C
17	Weight	TBD	g

## 2. MECHANICAL SPECIFICATION



### 3. PIN DESCRIPTION

#### 3.1 TYPE-C CN1(Connector Part No: 1024-FAB004 or compatible)

Pin No.	Symbol	I/O	Function	Note
A1	GND	P	Ground	
A2	TX1+	I/O	High speed data path TX for DP Alt Mode.	
A3	TX1-	I/O		
A4	VBUS	P	Cable bus power +5V only.	
A5	CC1	I/O	Type-C Port Configuration Channel	
A6	D+	I/O	USB 2.0 Interface.	
A7	D-	I/O		
A8	SBU1	I/O	USB Type-C Sideband Use 1	
A9	VBUS	P	Cable bus power +5V only.	
A10	RX2-	I/O	High speed data path RX for DP Alt Mode.	
A11	RX2+	I/O		
A12	GND	P	Ground	
B1	GND	P	Ground	
B2	TX2+	I/O	High speed data path TX for DP Alt Mode.	
B3	TX2-	I/O		
B4	VBUS	P	Cable bus power +5V only.	
B5	CC2	I/O	Type-C Port Configuration Channel	
B6	D+	I/O	USB 2.0 Interface.	
B7	D-	I/O		
B8	SBU2	I/O	USB Type-C Sideband Use 2	
B9	VBUS	P	Cable bus power +5V only.	
B10	RX1-	I/O	High speed data path RX for DP Alt Mode.	
B11	RX1+	I/O		
B12	GND	P	Ground	

#### 3.2 key Pad CN2 (50271-0040L-002 or compatible)

Pin	Symbol	I/O	Function	Note
1	Power on/off	I	Power On/Off control.	
2	Brightness increased	I	Brightness Increase.	
3	Brightness decrease	I	Brightness decrease.	
4	GND	P	Ground	

#### 4. ABSOLUTE MAXIMUM RATINGS

##### 4.1 Electrical Absolute Rating

##### 4.1.1 TFT LCD Module

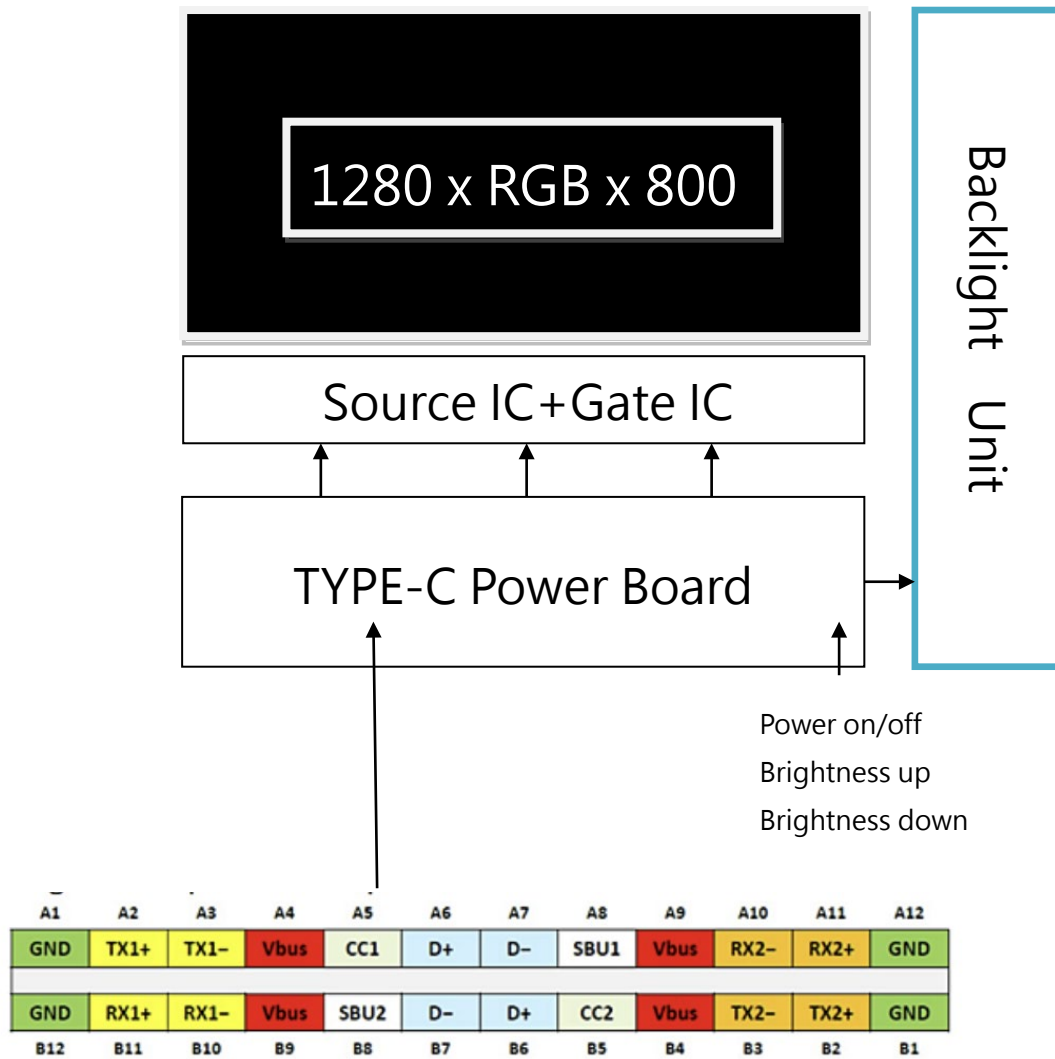
Item	Symbol	Values		Unit	Note
		Min	Max.		
Power supply voltage	VBUS	-0.3	6	V	

##### 4.1.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Topa	0		70	°C	Ambient temperature
Storage Temperature	Tstg	-30		80	°C	

## 5. BLOCK DIAGRAM

### 5.1 TFT LCD Module





## 6. ELECTRICAL CHARACTERISTICS

### 6.1 TFT LCD Module

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	V <sub>BUS</sub>	-	5.0	5.5	V	
required current	I <sub>BUS</sub>	-	1.0	1.1	A	(1)
LED life time	-	-	50000	-	Hr	(2)

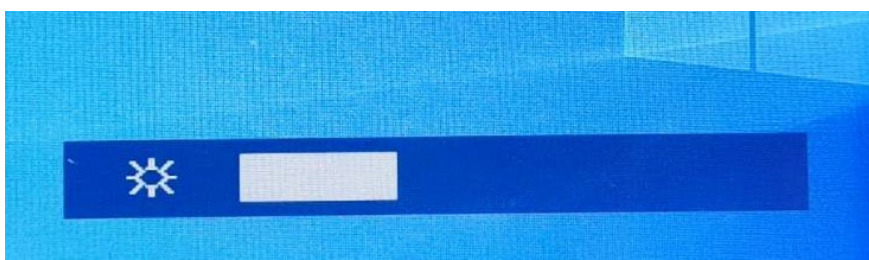
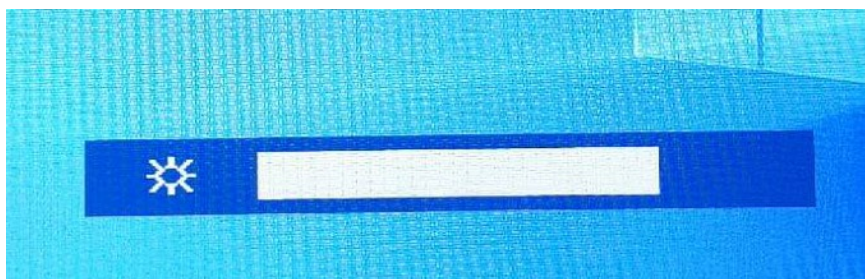
Note 1: condition: under brightness 100%

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C 60% RH.

### 6.2 OSD Function

Built-in OSD function, connected to the external key pad to CN2, can control the screen switch On/Off and backlight brightness control.

The adjusted brightness level will be automatically memorized.

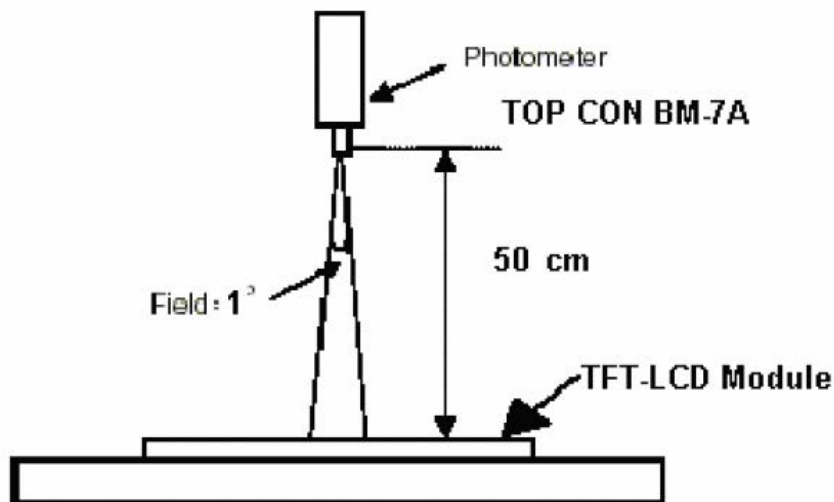


## 7. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Brightness	--	Note1, Note 3, ( $\theta = 0^\circ$ ; Normal Viewing Angle)	560	700	--	cd/m <sup>2</sup>
Uniformity	B-uni		70	75	-	%
Contrast Ratio	CR		400	600	--	--
Response Time	Tr		--	4	8	ms
	Tf		--	12	24	ms
Color Chromaticity	White	Wx	0.260	0.310	0.360	--
		Wy	0.280	0.330	0.380	--
View angle	Horizontal	$\theta_{x+}$	80	85	--	
		$\theta_{x-}$	80	85	--	
	Vertical	$\theta_{Y+}$	80	85	--	
		$\theta_{Y-}$	80	85	--	

Note : The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance  $\leq 1$  lux, and at room temperature). The operation temperature is  $25^\circ\text{C} \pm 2^\circ\text{C}$ . The measurement method is shown in Note1.

Note 1: The method of optical measurement:

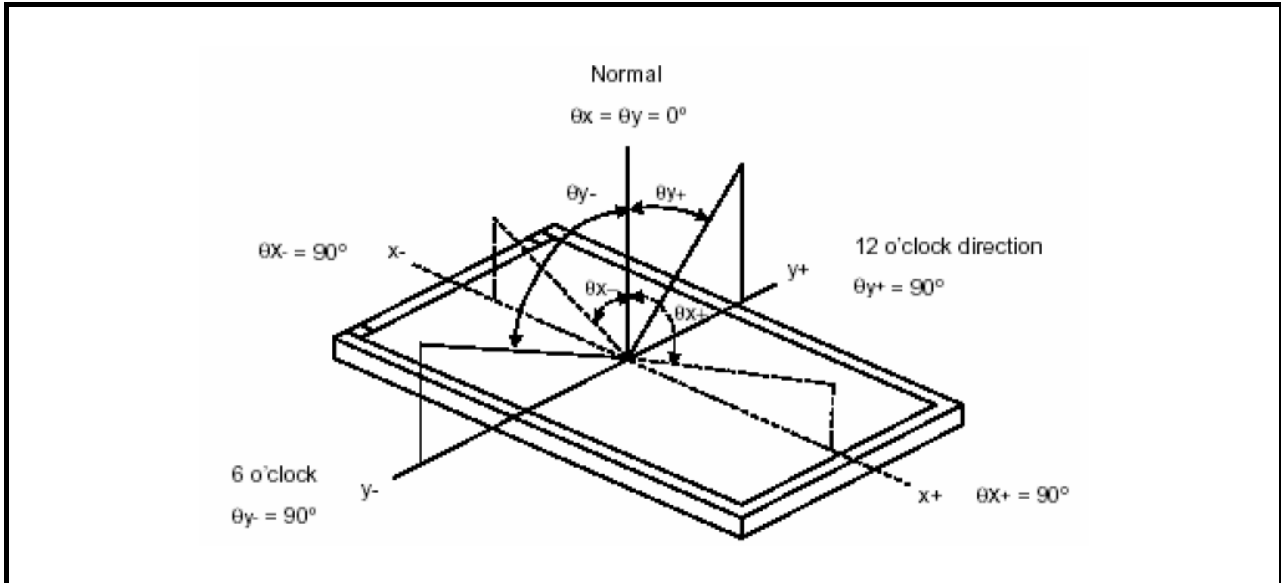


Note 2: Measured at the center area of the panel and at the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

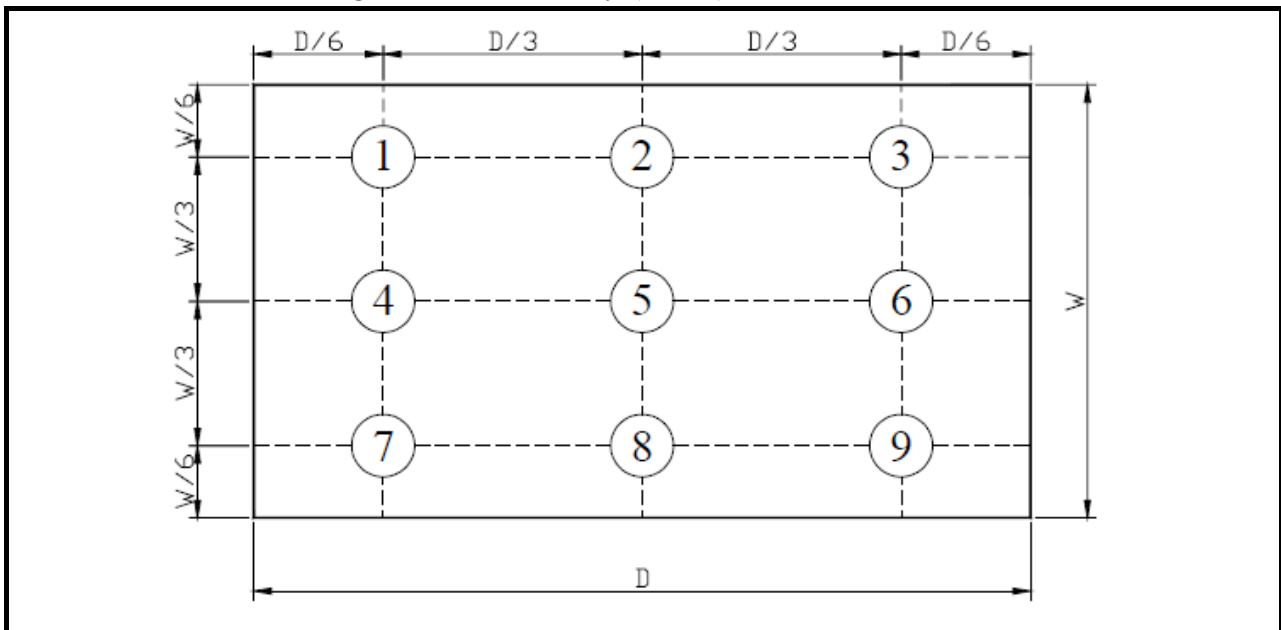
Note 3: Definition of Contrast Ratio (CR):

CR = Luminance with all pixels in white state  $\div$  Luminance with all pixels in Black state

**Note 4: Definition of Viewing Angle:**



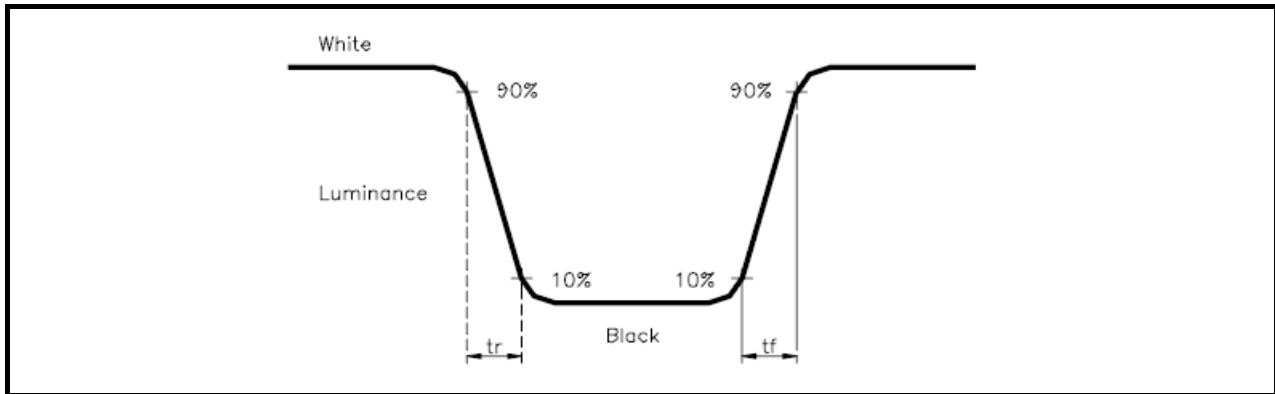
**Note 5: Definition of Brightness Uniformity (B-uni):**



B-uni = (Minimum luminance of 9 points ÷ Maximum luminance of 9 points) X 100%

**Note 6: Definition of Response Time:**

The Response Time is set initially by defining the “Rising Time ( $T_r$ )” and the “Falling Time ( $T_f$ )” respectively.  $T_r$  and  $T_f$  are defined as following figure



**Note 7: Definition of Chromaticity:**

The color coordinates ( $W_x, W_y$ ), ( $R_x, R_y$ ), ( $G_x, G_y$ ), and ( $B_x, B_y$ ) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

## 8. RELIABILITY

### 8.1 Test Condition

#### 8.1.1 Temperature and Humidity(Ambient Temperature)

Temperature :  $25 \pm 5^{\circ}\text{C}$

Humidity :  $65 \pm 5\%$

#### 8.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

#### 8.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

#### 8.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

### 8.2 TESTS

No.	ITEM	CONDITION CRITERION
1	High Temperature Storage	80°C, 120 hrs
2	Low Temperature Storage	-30°C, 120 hrs
3	High Temperature Operating	70°C, 120 hrs
4	Low Temperature Operating	0°C, 120 hrs
5	High Temperature/Humidity Non-Operating	50°C, 90%RH, 120 hrs
6	Temperature Shock Non-Operating	-30°C $\longleftrightarrow$ 70°C (0.5hr each), 25 cycles
7	Vibration Test Non-Operating	Frequency:0 ~ 55 Hz Amplitude:1.5 mm Sweep Time:11min Test Period:6 Cycles for each Direction of X,Y,Z
9	Electro-static Discharge Non-Operating	150pF,330Ω Air:± 8KV;Contact: ±4KV 10 times/point;4 points/panel face

Note1: The test sample have recovery time for 24 hours at room temperature before the function check. In the standard conditions, there is no any touch panel function NG issue occurred.

### **8.3 JUDGMENT STANDARD**

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

## 8.4 INCOMING INSPECTION STANDARDS

No.	Parameter	Criteria														
1	Operating	Display function: No Display malfunction (Major)														
		Contrast ratio (Black, White): Does not meet specified range in the spec. (Major) (Note:3)														
		Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)														
		Point Defect : Active area $\leq 5$ dots (Minor) (Note:1)														
		<table><tr><th rowspan="2">Item</th><th>Acceptable number</th><th rowspan="2">Total</th></tr><tr><th>Active Area</th></tr><tr><td>Bright</td><td>2</td><td rowspan="2">5</td></tr><tr><td>Dark</td><td>4</td></tr></table>	Item	Acceptable number	Total	Active Area	Bright	2	5	Dark	4					
		Item		Acceptable number		Total										
			Active Area													
		Bright	2	5												
		Dark	4													
		Non-uniformity: Visible through 5%ND filter. (Minor)														
Foreign material in Black or White spots shape ( $W>1/4L$ )																
<table><tr><th>Zone Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td><math>D&gt;0.5</math></td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr><tr><td><math>0.3 &lt; D \leq 0.5</math></td><td>5</td></tr><tr><td><math>D \leq 0.3</math></td><td>*</td></tr></table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	$D>0.5$	0	Minor	1.5	$0.3 < D \leq 0.5$	5	$D \leq 0.3$	*				
Zone Dimension	Acceptable number	Class Of Defects	AQL Level													
$D>0.5$	0	Minor	1.5													
$0.3 < D \leq 0.5$	5															
$D \leq 0.3$	*															
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																
Foreign Material in Line or spiral shape ( $W\leq 1/4L$ ) (Note: 4)																
<table><tr><th>L (mm)</th><th>Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td><math>L &gt; 5</math></td><td><math>W &gt; 0.1</math></td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr><tr><td><math>0.5 &lt; L \leq 5</math></td><td><math>0.03 &lt; W \leq 0.1</math></td><td>5</td></tr><tr><td><math>L \leq 0.5</math></td><td><math>W \leq 0.03</math></td><td>*</td></tr></table>	L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	$L > 5$	$W > 0.1$	0	Minor	1.5	$0.5 < L \leq 5$	$0.03 < W \leq 0.1$	5	$L \leq 0.5$	$W \leq 0.03$	*
L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level												
$L > 5$	$W > 0.1$	0	Minor	1.5												
$0.5 < L \leq 5$	$0.03 < W \leq 0.1$	5														
$L \leq 0.5$	$W \leq 0.03$	*														
$L$ : Length $W$ : Width    * : Disregard																
2	External Inspection (non-operating)	Dimension: Outline (Major)														
		Bezel appearance: uneven (Minor)														
		Scratch on the polarize: (Note:2)														
		<table><tr><th>L (mm)</th><th>Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td>--</td><td><math>W &gt; 0.1</math></td><td>0</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr><tr><td><math>L \leq 3</math></td><td><math>W \leq 0.1</math></td><td>3</td></tr></table>	L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	--	$W > 0.1$	0	Minor	1.5	$L \leq 3$	$W \leq 0.1$	3	
		L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level										
		--	$W > 0.1$	0	Minor	1.5										
		$L \leq 3$	$W \leq 0.1$	3												
		$L$ : Length $W$ : Width    * : Disregard														
		Dent or bubble on the polarize (Note:2)														
		<table><tr><th>Zone Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td><math>D \leq 0.3</math></td><td>*</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr><tr><td><math>D \leq 0.5</math></td><td>3</td></tr></table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	$D \leq 0.3$	*	Minor	1.5	$D \leq 0.5$	3				
Zone Dimension	Acceptable number	Class Of Defects	AQL Level													
$D \leq 0.3$	*	Minor	1.5													
$D \leq 0.5$	3															
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																

Class of defects	Major	AQL 0.65%	Definition
	Minor	AQL 1.5%	It is a defect that will not result in functioning problem with deviation classified.

Note1:

(a) Bright point defect is defined as point defect of R,G,B with area  $>1/2$  pixel respectively

(b) Dark point defect is defined as visible in full white pattern.

(c) Definition of distribution of point defect is as follows:

- minimum separation between dark point defects should be larger than 5mm.
- minimum separation between bright point defects should be larger than 5mm.

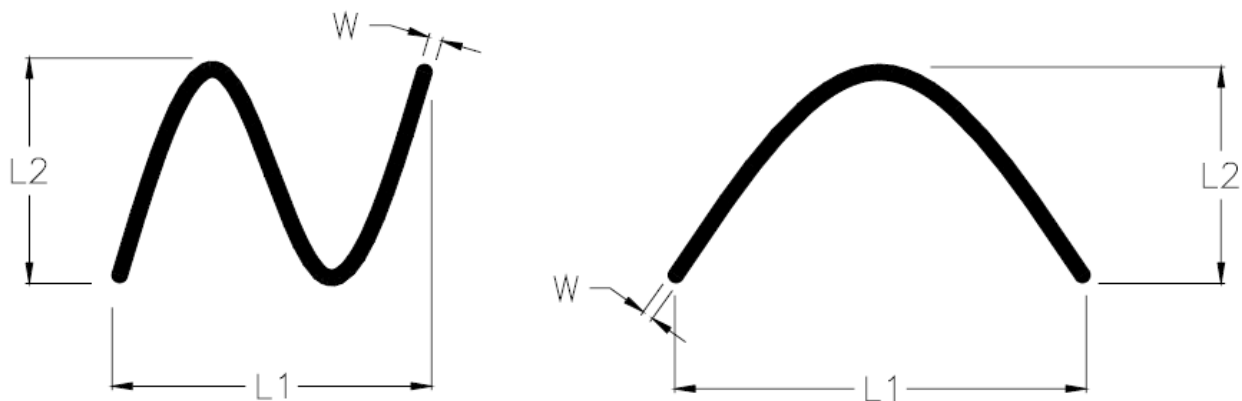
(d) Definition of joined bright point defect and joined dark point defect are as follows:

- Two or more joined bright point defects must be nil.
- Three joined dark point defects must be nil.
- Coupling of one dark and one bright point in junction is counted as one dark and bright spot with 1 pair maximum.
- Two Joined dark point is counted as two dark points with 2 pair maximum.

Note2: The external inspection should be conducted at the distance  $30 \pm 5$  cm between the eyes of inspector and the panel.

Note3: Luminance measurement for contrast ratio is at the distance  $50 \pm 5$  cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note4: W-Width in mm , L-length of Max.(L1,L2) in mm.





### 8.5 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

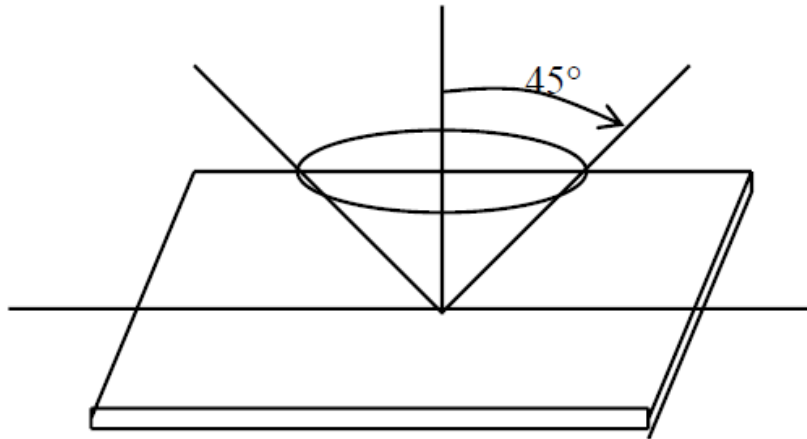
Inspection level: Level II

### 8.6 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.

$\theta \leq 45^\circ$  inspection under non-operating condition.

$\theta \leq 5^\circ$  inspection under operating condition



## **9. PRECAUTION RELATING PRODUCT HANDLING**

### **9.1 SAFETY**

- 9.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.**
- 9.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.**

### **9.2 HANDLING**

- 9.2.1 Avoid any strong mechanical shock which can break the glass.**
- 9.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.**
- 9.2.3 Do not remove the panel or frame from the module.**
- 9.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)**
- 9.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.**
- 9.2.6 Do not touch the display area with bare hands , this will stain the display area.**
- 9.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.**
- 9.2.8 To control temperature and time of soldering is  $280 \pm 10^{\circ}\text{C}$  and 3-5 sec.**
- 9.2.9 To avoid liquid (include organic solvent) stained on LCM.**

### **9.3 STORAGE**

- 9.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.**
- 9.3.2 Do not place the module near organics solvents or corrosive gases.**
- 9.3.3 Do not crush, shake, or jolt the module.**

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