




# TFT Module Specification

## MODEL: UC-101ZIEB0HDO-S

< ◆ > PRELIMINARY SPECIFICATION

< ◇ > APPROVAL SPECIFICATION

<b>CUSTOMER</b>
<b>APPROVED BY</b>
<b>DATE:</b>

DESIGNED	CHECKED	APPROVED
		

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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

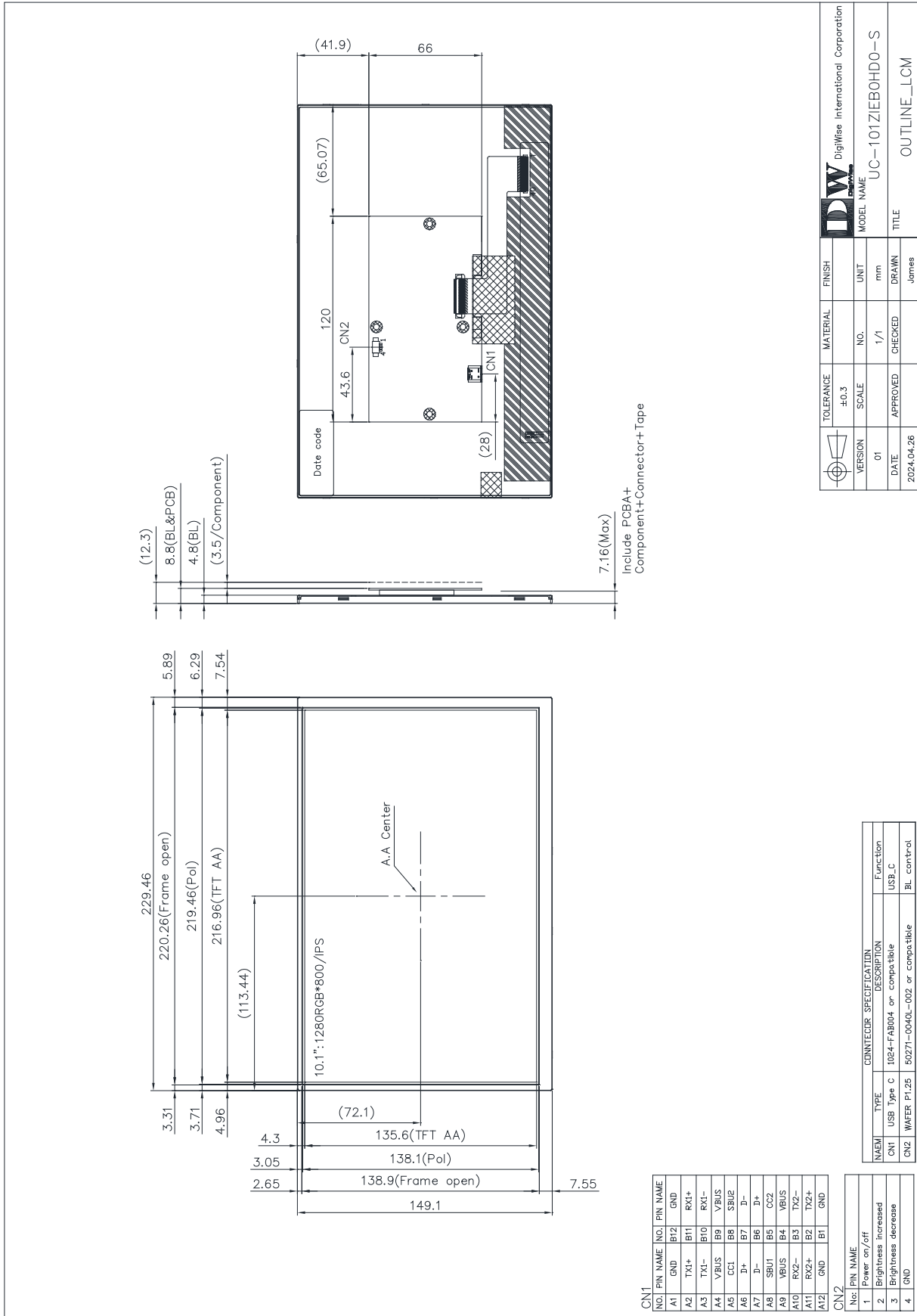
The specification is model UC-101ZIEB0HD0-S is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit, a backlight system. This TFT LCD has a 10.1 (16:10) inch diagonally 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**

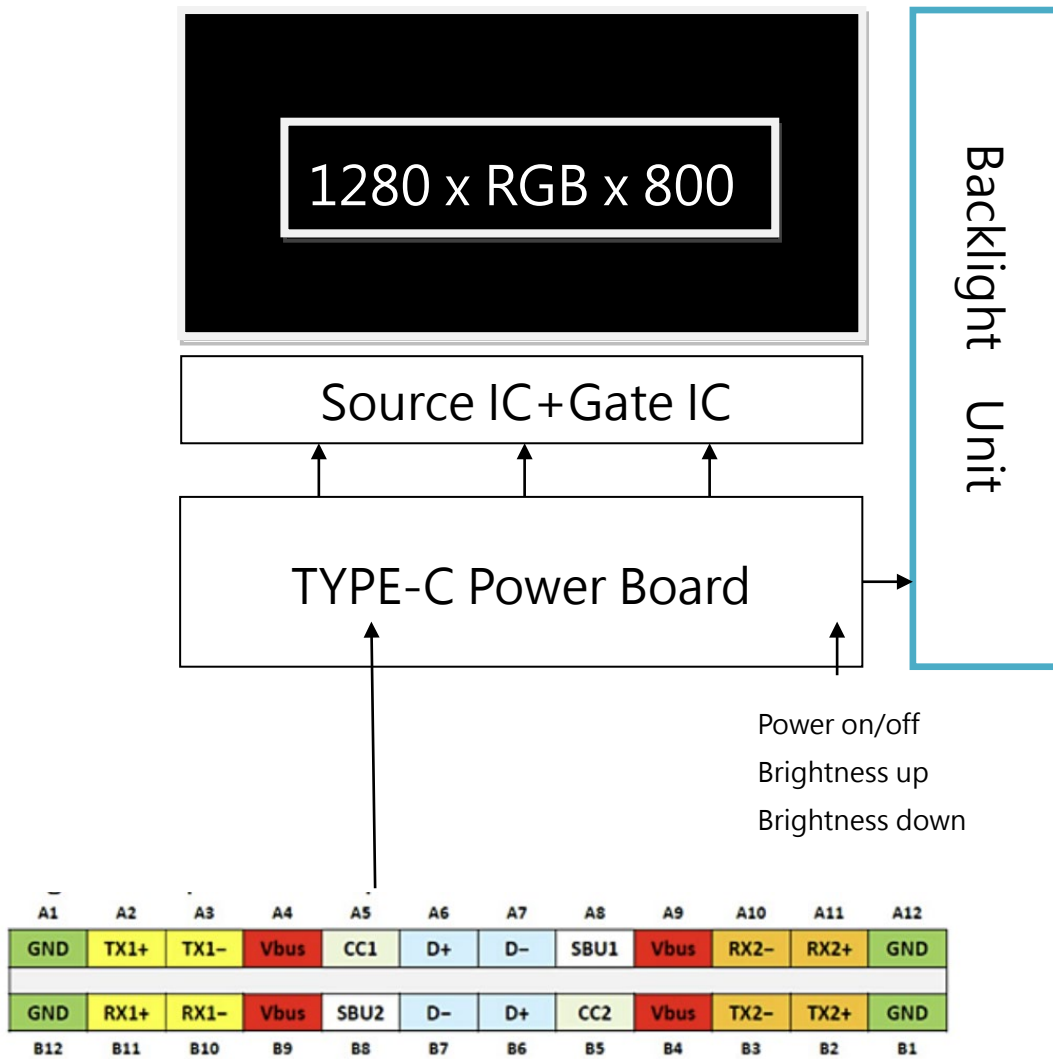
Item	Symbol	Values		Unit	Note
		Min	Max.		
Power supply voltage	VBUS	-0.3	6	V	

**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)

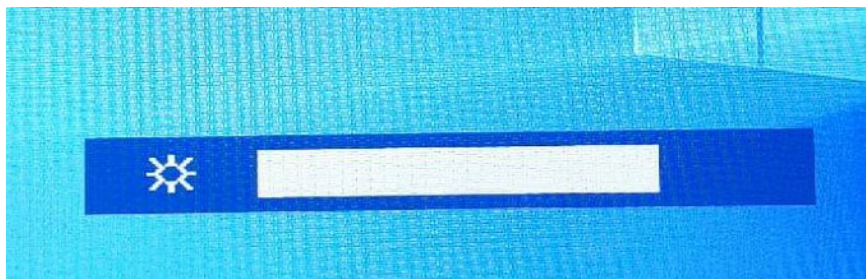
Note 1: condition: under brightness 100%

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.

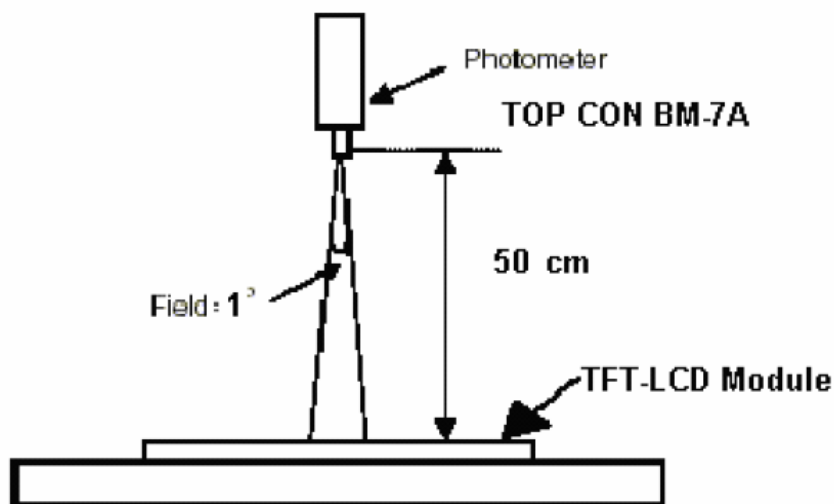


### 7. OPTICAL CHARACTERISTICS

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:

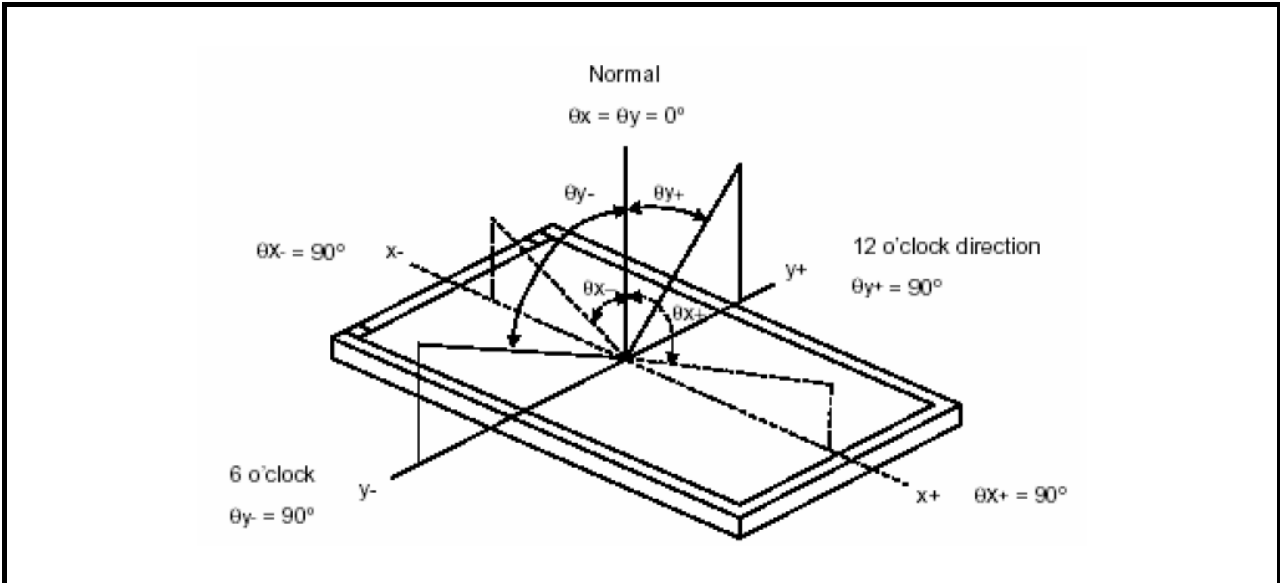


Note 2: Measured at the center area of the panel and at the viewing angle of the  $\theta x = \theta y = 0^\circ$

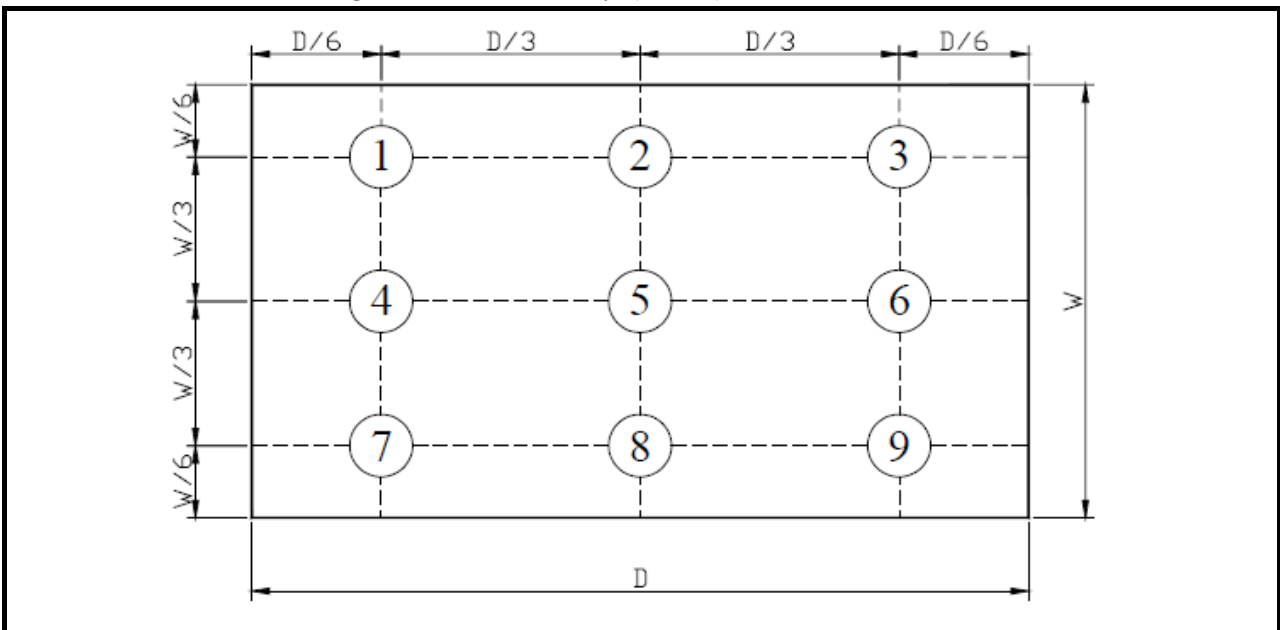
Note 3: Definition of Contrast Ratio (CR):

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

Note 4: Definition of Viewing Angle:



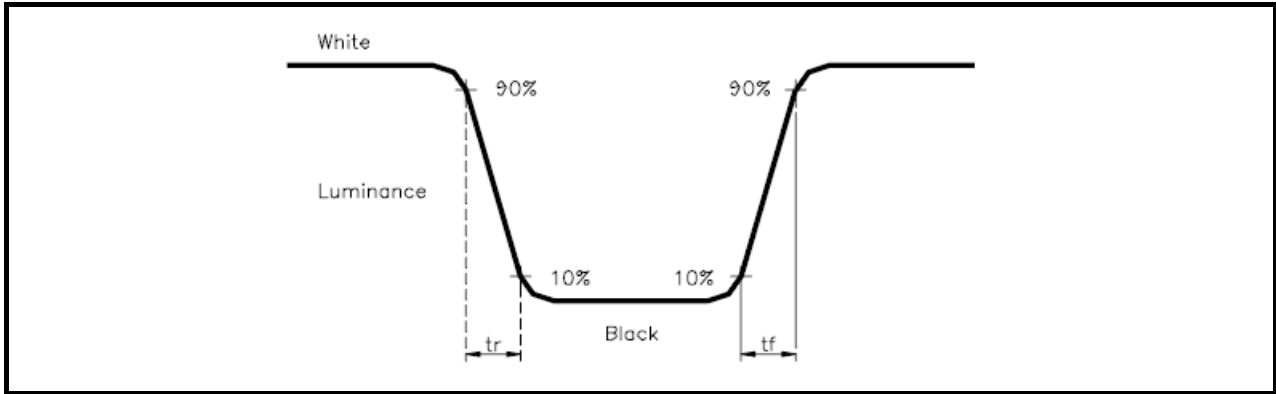
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = (\text{Minimum luminance of 9 points} \div \text{Maximum luminance of 9 points}) \times 100\%$$

**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 ± 5°C

Humidity : 65 ± 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 ←→ 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 ≤ 5 dots (Minor) (Note:1)												
		<table border="1"> <thead> <tr> <th rowspan="2">Item</th> <th>Acceptable number</th> <th rowspan="2">Total</th> </tr> <tr> <th>Active Area</th> </tr> </thead> <tbody> <tr> <td>Bright</td> <td>2</td> <td rowspan="2">5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Active Area	Bright	2	5	Dark	4			
Item	Acceptable number	Total												
	Active Area													
Bright	2	5												
Dark	4													
2	External Inspection (non-operating)	Non-uniformity: Visible through 5%ND filter. (Minor)												
		Foreign material in Black or White spots shape (W>1/4L)												
		<table border="1"> <thead> <tr> <th>Zone Dimension</th> <th>Acceptable number</th> <th rowspan="3">Class Of Defects</th> <th rowspan="3">AQL Level</th> </tr> </thead> <tbody> <tr> <td>D &gt; 0.5</td> <td>0</td> </tr> <tr> <td>0.3 &lt; D ≤ 0.5</td> <td>5</td> </tr> <tr> <td>D ≤ 0.3</td> <td>*</td> <td>Minor</td> <td>1.5</td> </tr> </tbody> </table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	D > 0.5	0	0.3 < D ≤ 0.5	5	D ≤ 0.3	*	Minor	1.5
		Zone Dimension	Acceptable number	Class Of Defects			AQL Level							
		D > 0.5	0											
0.3 < D ≤ 0.5	5													
D ≤ 0.3	*	Minor	1.5											
D = (Long + Short) / 2 * : Disregard														
Foreign Material in Line or spiral shape (W≤1/4L) (Note: 4)														
<table border="1"> <thead> <tr> <th>L (mm) \ Zone W(mm)</th> <th>Acceptable number</th> <th rowspan="3">Class Of Defects</th> <th rowspan="3">AQL Level</th> </tr> </thead> <tbody> <tr> <td>L &gt; 5, W &gt; 0.1</td> <td>0</td> </tr> <tr> <td>0.5 &lt; L ≤ 5, 0.03 &lt; W ≤ 0.1</td> <td>5</td> </tr> <tr> <td>L ≤ 0.5, W ≤ 0.03</td> <td>*</td> <td>Minor</td> <td>1.5</td> </tr> </tbody> </table>	L (mm) \ Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	L > 5, W > 0.1	0	0.5 < L ≤ 5, 0.03 < W ≤ 0.1	5	L ≤ 0.5, W ≤ 0.03	*	Minor	1.5		
L (mm) \ Zone W(mm)	Acceptable number	Class Of Defects			AQL Level									
L > 5, W > 0.1	0													
0.5 < L ≤ 5, 0.03 < W ≤ 0.1	5													
L ≤ 0.5, W ≤ 0.03	*	Minor	1.5											
L : Length W : Width * : Disregard														
2	External Inspection (non-operating)	Dimension: Outline (Major)												
		Bezel appearance: uneven (Minor)												
		Scratch on the polarize: (Note:2)												
		<table border="1"> <thead> <tr> <th>L (mm) \ Zone W(mm)</th> <th>Acceptable number</th> <th rowspan="3">Class Of Defects</th> <th rowspan="3">AQL Level</th> </tr> </thead> <tbody> <tr> <td>--, W &gt; 0.1</td> <td>0</td> </tr> <tr> <td>L ≤ 3, W ≤ 0.1</td> <td>3</td> </tr> </tbody> </table>	L (mm) \ Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	--, W > 0.1	0	L ≤ 3, W ≤ 0.1	3				
		L (mm) \ Zone W(mm)	Acceptable number	Class Of Defects			AQL Level							
--, W > 0.1	0													
L ≤ 3, W ≤ 0.1	3													
L : Length W : Width * : Disregard														
Dent or bubble on the polarize (Note:2)														
<table border="1"> <thead> <tr> <th>Zone Dimension</th> <th>Acceptable number</th> <th rowspan="3">Class Of Defects</th> <th rowspan="3">AQL Level</th> </tr> </thead> <tbody> <tr> <td>D ≤ 0.3</td> <td>*</td> </tr> <tr> <td>D ≤ 0.5</td> <td>3</td> </tr> </tbody> </table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	D ≤ 0.3	*	D ≤ 0.5	3						
Zone Dimension	Acceptable number	Class Of Defects			AQL Level									
D ≤ 0.3	*													
D ≤ 0.5	3													
D = (Long + Short) / 2 * : Disregard														

Class of defects			Definition
	<b>Major</b>	AQL 0.65%	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
<b>Minor</b>	AQL 1.5%	It is a defect that will not result in functioning problem with deviation classified.	

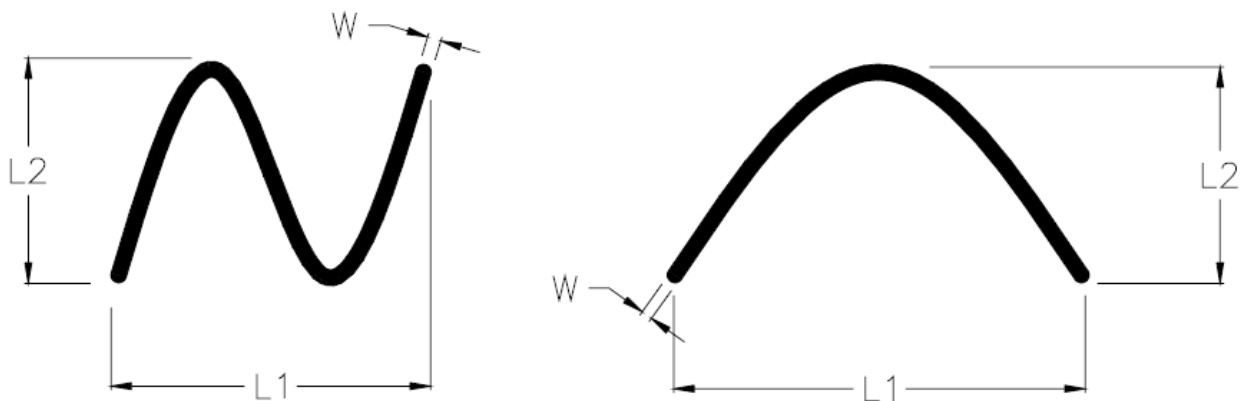
**Note1:**

- (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

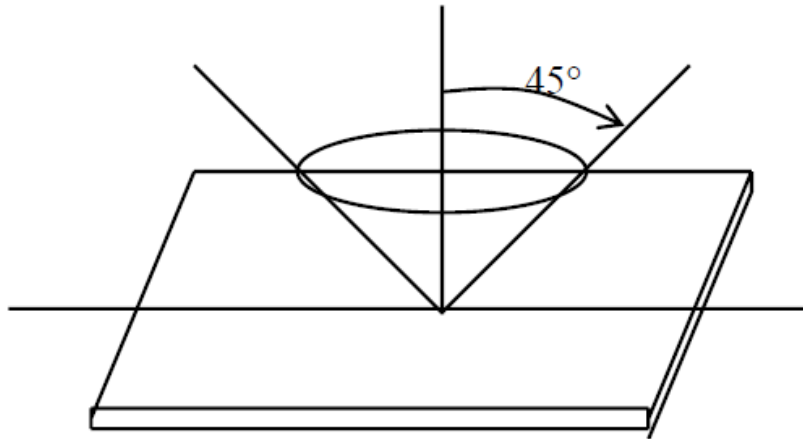
Inspection level: Level II

### 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.**