
SPECIFICATION

产品规格书

Version: V0

版本: V0

This module uses ROHS material

模块用环保材料

PRODUCT LCD MODULE

产品名称 : 液晶显示模块

MODELNO

模块型号 : HT0160YC8-V01

DATE

日期 : 2021-03-16

CHECKED BY 审核		
Quality Department 品质		
Approved by 批准		
		Approved By _____

RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
2021-03-16	A0	FIRST ISSUE			

GENERAL INFORMATION 主要特征描述

Item 项目	Contents 内容	Unit 单位
LCD Type 液晶显示类型	TFT/TRANSMISSIVE/IPS	---
Viewing Direction 视角方向	FREE	O'Clock
Outline Dimensions (W × H×T) 外形尺寸 (宽 x 高 x 厚)	42.94(W) ×45.89(H)×1.60(T)	mm
Viewing area 可视区域	40.34(W) x 40.34(H)	mm
Active area 有效区域 (宽 × 高)	39.84(W) x 39.84(H)	mm
Number of Dots 点阵	400RGB x 400 Dots	---
Driver IC 驱动 IC	ST77903	---
Interface Type 接口类型	Quad-SPI Interface	---
Input voltage 输入电压	2.8V	-
Module Power consumption 模块功耗	TBD	MW
Colors 色彩	16.7M	---
Backlight Type 背光类型	LED	---

1. Outline Drawing

[illegible]

2. Absolute Maximum Ratings(Ta=25℃)

Item	Symbol	Min	Max	Unit
Supply voltage (Logic)	VCC	-0.3	4.6	V
Operating temperature	TOPR	-20	70	℃
Storage temperature	TSTR	-30	80	℃

3. Electrical Specifications and Instruction Code

3.1 Electrical characteristics (Ta=25℃)

Parameter	Symbol	Condition	Specification			Unit	Related Pins
			MIN.	TYP.	MAX.		
Power & Operation Voltage							
System Voltage	VDD / VDDA	Operating voltage	2.6	2.75	3.3	V	-
Interface Operation Voltage	VDDI	I/O Supply Voltage	1.65	1.8	3.3	V	-
Gate Driver High Voltage	VGH	-	12.6	-	15.5	V	-
Gate Driver Low Voltage	VGL	-	-11.8	-	-8.4	V	-
Gate Driver Supply Voltage	-	VGH-VGL	-	-	27.3	V	-

3.2 Interface Signals

Pin No.	Symbol	I/O	Function
1	GND		Ground.
2	RS		Display data/command selection pin
3	CS		Chip selection pin
4	SCLK		is used to be serial interface clock.
5	IO3		Data pin.
6	IO2		Data pin.
7	IO1		Data pin.
8	IO0		Data pin.
9	RSTN		System reset pin
10	VDD		power supply
11	LEDA		LED Positive.
12	LEDK		LED Negative.
13	GND		Ground.
14	GND		Ground.

4.0 LED backlight specification

Item(项目)		Symbol (符号)	min. (最小值)	typ. (中间值)	max. (最大值)	Unit (单位)	Condition (条件)
BL	Luminance(亮度)	LV	11000	12000		CD/m²	If=80mA (定电流测试)
	Uniformity(均匀性)	Avg	80			%	
	Colour Coordinate (色坐标)	X	0.240	0.270	0.300		
		Y	0.245	0.275	0.305		
LCM	Luminance(亮度)	LV	315	340	375	CD/m²	在纯白色画面时, If=80mA (定电流测试)
	Uniformity(均匀性)	Avg	80			%	
	Colour Coordinate (色坐标)	X					
		Y					
Forward Voltage(正向电压)		Vf	2.8	3.0	3.2	V	

4.1 Reliability

No.	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±2℃ 96H Restore 4H at 25℃	1. After testing, cosmetic defects should not happen. 2.Total current consumption should not be over 10% of initial value.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 4H at 25℃	
3	High Temperature Operation	70℃±2℃ 48H Restore 4H at 25℃	
4	Low Temperature Operation	-20℃±2℃ 48H Restore 4H at 25℃	
5	High Temperature /Humidity Storage	40℃±2℃ 90%RH 48H	
6	Temperature Cycle	-30℃ \longleftrightarrow 25℃ \longleftrightarrow 80℃ 5min 30min \longleftrightarrow 25℃ , 5min after 10cycle, Restore 4H at 25℃	
7	Vibration Test (package state)	10Hz~150Hz, 100m/s ² , 120min	Not allowed cosmetic and electrical defects.
8	ESD test	Air discharge: plus or minus 8KV Contact discharge:	
9	Atmospheric Pressure Test	25kPa 16H Restore 2H	

5. Precautions for Use of LCD Modules

5.1 Handling Precautions

5.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high

place, etc.

5.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

5.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

5.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

5.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol

— Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer.

Especially, do not use the following:

— Water

— Ketone

— Aromatic solvents

5.1.6 Do not attempt to disassemble the LCD Module.

5.1.7 If the logic circuit power is off, do not apply the input signals.

5.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

5.2 Storage precautions

5.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

5.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$

Relatively humidity: $\leq 80\%$

5.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

5.3 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

6.LCM Quality Criteria

6.1 VISUAL & FUNCTION INSPECTION STANDARD

6.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

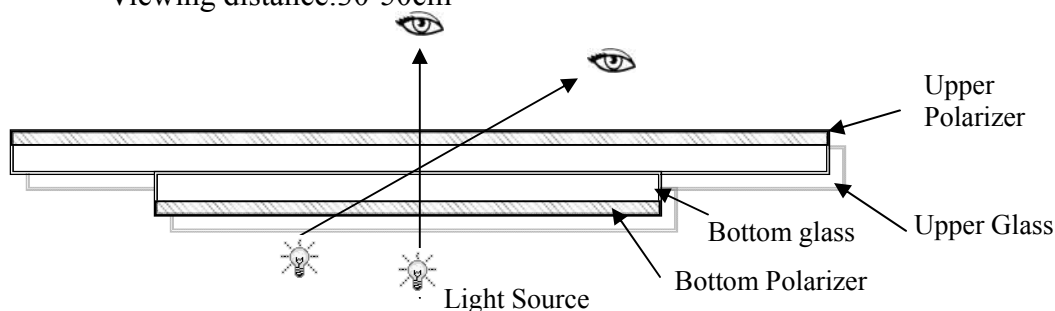
Temperature : $25\pm 5^{\circ}\text{C}$

Humidity : $65\%\pm 10\%\text{RH}$

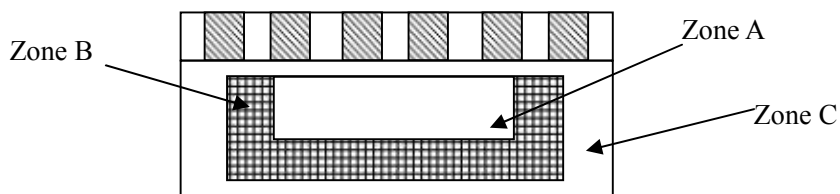
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



6.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function
or appearance after assembly by customer.

6.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

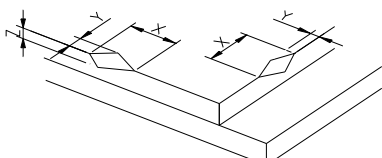
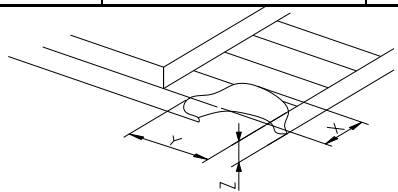
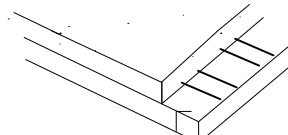
AQL:

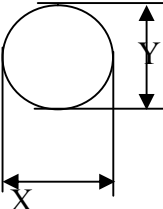
Major defect	Minor defect
0.65	1.5

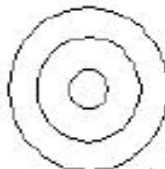


LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

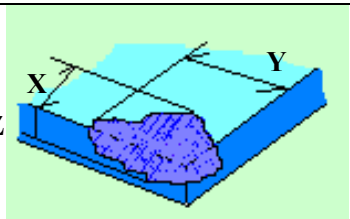
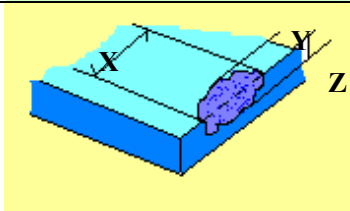
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

6.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken								
NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken								
		<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	(3) LCD crack	 Crack Not allowed						

Number	Items	Criteria (mm)				
2.0	Spot defect  Φ=(X+Y)/2	① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain）				
		Zone Size (mm)	Acceptable Qty			Ignore
			A	B	C	
		Φ≤0.10	Ignore		Ignore	
		0.10<Φ≤0.15	3(distance≥10mm)			
		0.15<Φ≤0.2	1			
		0.2<Φ	0			
		②Dim spot（LCD/TP/Polarizer dim dot, light leakage、dark spot）				
		Zone Size (mm)	Acceptable Qty			Ignore
			A	B	C	
		Φ≤0.1	Ignore		Ignore	
		0.1<Φ≤0.2	2(distance≥10mm)			
		0.2<Φ≤0.3	1			
		Φ>0.3	0			
		③ Polarizer accidented spot				
		Zone Size (mm)	Acceptable Qty			Ignore
			A	B	C	
		Φ≤0.2	Ignore		Ignore	
		0.2<Φ≤0.5	2(distance≥10mm)			
		Φ>0.5	0			
	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	Width(mm)	Length(mm)	Acceptable Qty		
			A	B	C	
Φ≤0.03		Ignore	Ignore		Ignore	
0.03<W≤0.05		L≤3.0	N≤2			
0.05<W≤0.08		L≤2.0	N≤2			
0.08<W		Define as spot defect				

3.0	Polarizer Bubble	<table><tr><td rowspan="2">Zone Size (mm)</td><td colspan="3">Acceptable Qty</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>$\Phi \leq 0.2$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.2 < \Phi \leq 0.4$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.4 < \Phi \leq 0.6$</td><td colspan="2">1</td></tr><tr><td>$0.6 < \Phi$</td><td colspan="2">0</td></tr></table>				Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.2 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)		$0.4 < \Phi \leq 0.6$	1		$0.6 < \Phi$	0	
Zone Size (mm)	Acceptable Qty																								
	A	B	C																						
$\Phi \leq 0.2$	Ignore		Ignore																						
$0.2 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)																								
$0.4 < \Phi \leq 0.6$	1																								
$0.6 < \Phi$	0																								
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.																							
5.0	TP Related	TP bubble/ accidented spot	Size $\Phi(\text{mm})$	Acceptable Qty																					
				A	B	C																			
				$\Phi \leq 0.1$		Ignore																			
				Ignore																					
				$0.1 < \Phi \leq 0.2$																					
2																									
$0.2 < \Phi \leq 0.3$		1																							
$0.3 < \Phi$		0																							
Assembly deflection		beyond the edge of backlight $\leq 0.15\text{mm}$																							
		Newton Ring	Newton Ring area $>1/3$ TP area NG		 1 规律性																				
			Newton Ring area $\leq 1/3$ TP area OK		 2 非规律性																				
					 似牛顿环																				

		<div>TP corner broken</div> <div>X: length</div> <div>Y: width</div> <div>Z: height</div>	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 3.0\text{mm}$</td><td>$Y \leq 3.0\text{mm}$</td><td>$Z < \text{LCD thickness}$</td></tr></table> <div>* Circuitry broken is not allowed.</div>	X	Y	Z	$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$	<div>Z</div> 
X	Y	Z								
$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$								
		<div>TP edge broken</div> <div>X: length</div> <div>Y: width</div> <div>Z: height</div>	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 6.0\text{mm}$</td><td>$Y \leq 2.0\text{mm}$</td><td>$Z < \text{LCD thickness}$</td></tr></table> <div>* Circuitry broken is not allowed.</div>	X	Y	Z	$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$	<div>Z</div> 
X	Y	Z								
$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$								

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

6.2 Safety instructions

6.2.1 If the LCD panel breaks, be careful not to get any liquid crystal substance in your mouth.

6.2.2 If the liquid crystal substance touches your skin or clothes, please wash it off immediately by using soap and water.

6.3 Handling Precautions

6.3.1 Avoid static electricity damaging the LSI.

6.3.2 Do not remove the panel or frame from the module .

6.3.3 The polarizing plate of the display is very fragile . So, please handle it very carefully.

6.3.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.

6.3.5 The color tone of display and background of LCM has the possibility to be changed in the storage temperature range.

6.3.6 Pay attention to the working environment, as the element may be destroyed by static electricity.

--Be sure to ground human body and electric appliance during work.

--Avoid working in a dry environment to minimize the generations of static electricity.

--Static electricity may be generated when the protective film is fast peeled off.

6.3.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.

6.3.8 If the display surface becomes contaminated ,breathe on the surface and gently wipe it with a soft-dry- clean cloth .If it is heavily contaminated ,moisten cloth with the following solvent(ex:Ethyl alcohol).Solvents other than those above-mentioned may damage the

polarizer(Especially ,do not use them .ex: Water / Ketone)

6.4 Operation instructions

- 6.4.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.
- 6.4.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.
- 6.4.3 If the display area is pushed hard during operation, the display will become abnormal.
- 6.4.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

6.5 Storage instructions:

- 6.5.1 Store LCDs in a sealed polyethylene bag.
- 6.5.2 Store LCDs in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0°C and 35°C.
- 6.5.3 Avoid the polarizer touch any other object, (It is recommended to store them in the container in which they were shipped.)