SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
MODEL	**SCT080004-V01**
CUSTOMER APPROVED	

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RECORDS OF REVISIONS

Version	Content	Date
A0	First Issue	2020-04-24
A1	Revision outline drawing	2020-04-26

CONTENTS

- General Description
- Electrical Characteristics
- Optical characteristics
- Reliability
- Precaution
- Outline Dimension
- Packing method

1. General Description

This Module SCT080004-V01 is TFT Liquid Crystal Display Module. This specification covers the delivery requirements for the liquid crystal display module delivered by quality to Customer.

1.1. Mechanical & Display Specifications

Item	Standard value	Unit
LCD Size	8	inch
Dot Matrix	800(RGB) ×600	pixel
Module Size	183.00 ×141.00 ×10.26	mm
Active Area	162.00 ×121.50	mm
Dot Pitch	0.2025 ×0.2025	mm
Pixel Configuration	R.G.B. Stripe	-
Color depth	262K	-
Display Mode	Normally White, Transmissive	-
Technology Type	a-Si	-
Viewing Direction	12 o'clock	-
Gray Scale Inversion Direction	6 o'clock	-
Driver IC	TBD	-
Interface	RGB, DE Mode	-
LED Numbers	27 LEDs	-
Weight	TBD	g

1.2. Interface Pin

Pin No.	Symbol	Type	Description
1	A	P	LED Backlight driving anode
2	A	P	LED Backlight driving anode
3	K	P	LED Backlight driving cathode
4	K	P	LED Backlight driving cathode
5	GND	P	Power ground
6	GND	P	Power ground
7	VDD	P	Power supply
8	VDD	P	Power supply
9	VDD	P	Power supply
10	VDD	P	Power supply
11	DE	I	Data enable
12	GND	P	Power ground
13	B5	I	Blue data
14	B4	I	Blue data
15	B3	I	Blue data
16	GND	P	Power ground
17	B2	I	Blue data
18	B1	I	Blue data
19	B0	I	Blue data
20	GND	P	Power ground
21	G5	I	Green data
22	G4	I	Green data
23	G3	I	Green data
24	GND	P	Power ground
25	G2	I	Green data
26	G1	I	Green data
27	G0	I	Green data
28	GND	P	Power ground
29	R5	I	Red data
30	R4	I	Red data
31	R3	I	Red data
32	GND	P	Power ground
33	R2	I	Red data
34	R1	I	Red data
35	R0	I	Red data
36	GND	P	Power ground
37	GND	P	Power ground
38	DCLK	I	Sample clock
39	GND	P	Power ground
40	GND	P	Power ground

Note1: TYPE definition: I-----Input O---Output P----Power/Ground

TP Pin Description:

Pin No.	Symbol	Description
1	Top	Touch panel top
2	Right	Touch panel right
3	Bottom	Touch panel bottom
4	Left	Touch panel left

2. Electrical Characteristics

2.1. Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	-0.3	5	V	
Input Signal Voltage	V_{IN}	-0.3	VDD	V	Note 1
Operating Temperature	T_{OPR}	-20	+70	℃	Ambient
Storage Temperature	T_{STG}	-30	+80	℃	Ambient

Note1: VIN represent IO

2.2. DC Electrical Characteristics

2.2.1. Driving TFT LCD Panel

GND=0V, Ta=25℃

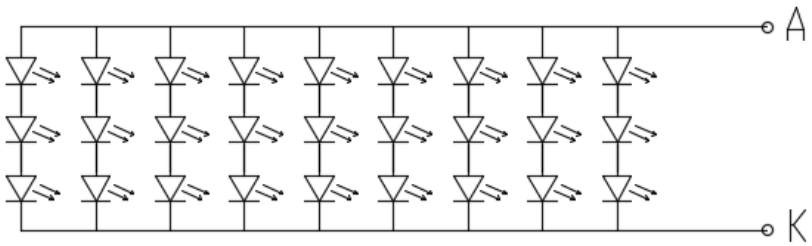
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Operating Voltage	VDD	3.0	3.3	3.6	V	
Logic High level input voltage	V_{IH}	0.7VDD	-	VDD	V	
Logic Low level input voltage	V_{IL}	0	-	0.3VDD	V	
Power Consumption	I_{CC}	-	TBD	-	mA	

2.2.2. Driving Backlight

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I_F	-	180	190	mA	Note1
Forward Current Voltage	V_F	8.25	9.6	9.9	V	
Operating Life Time	-	-	20000	-	hrs	

Note 1: The figure below shows the connection of backlight LED.



Note 2: One LED: I_F =20mA.

2.3. AC Electrical Characteristics

2.3.1. AC Electrical Characteristics

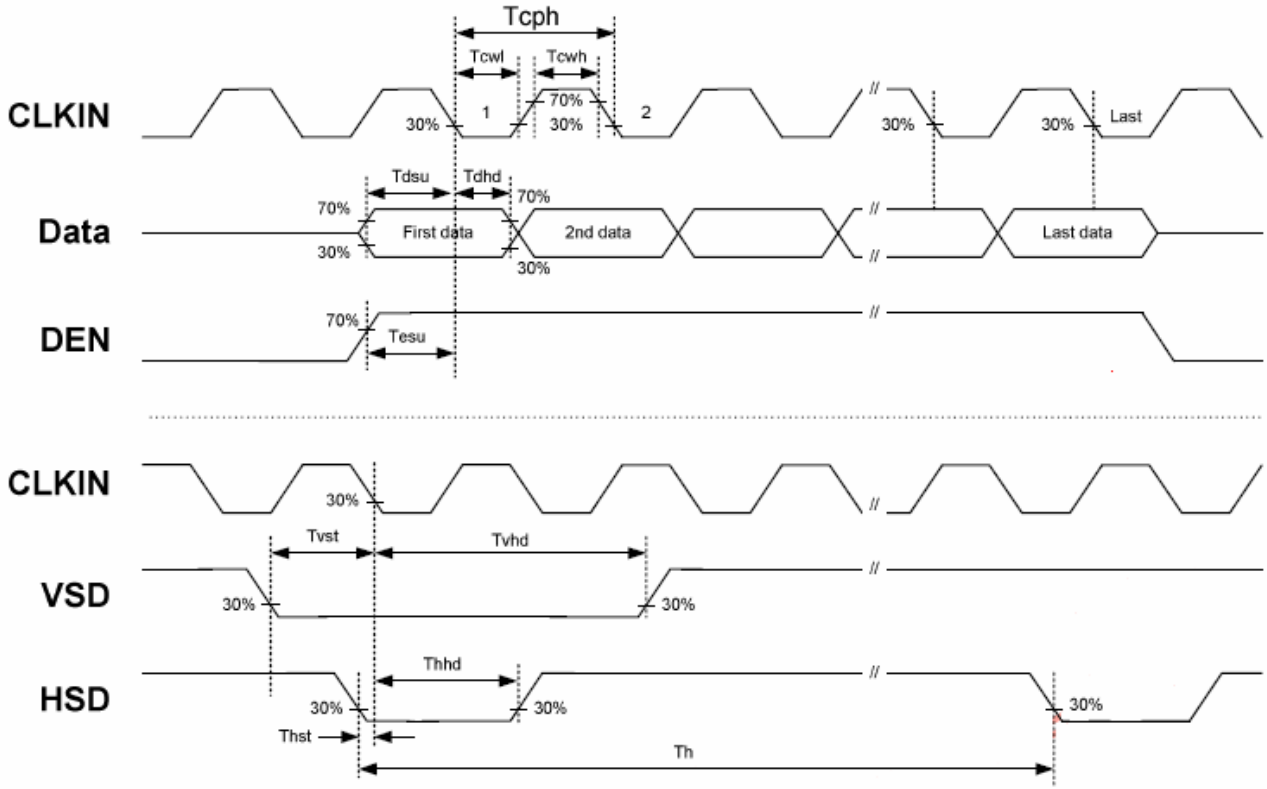
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	Ns	
HS hold time	T_{hhd}	8	-	-	Ns	
VS setup time	T_{vst}	8	-	-	Ns	
VS hold time	T_{vhd}	8	-	-	Ns	
Data setup time	T_{dsu}	8	-	-	Ns	
Data hole time	T_{dhd}	8	-	-	Ns	
DE setup time	T_{esu}	8	-	-	Ns	
DE hole time	T_{ehd}	8	-	-	Ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	10	-	-	us	
CLKIN cycle time	T_{coh}	20	-	-	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	

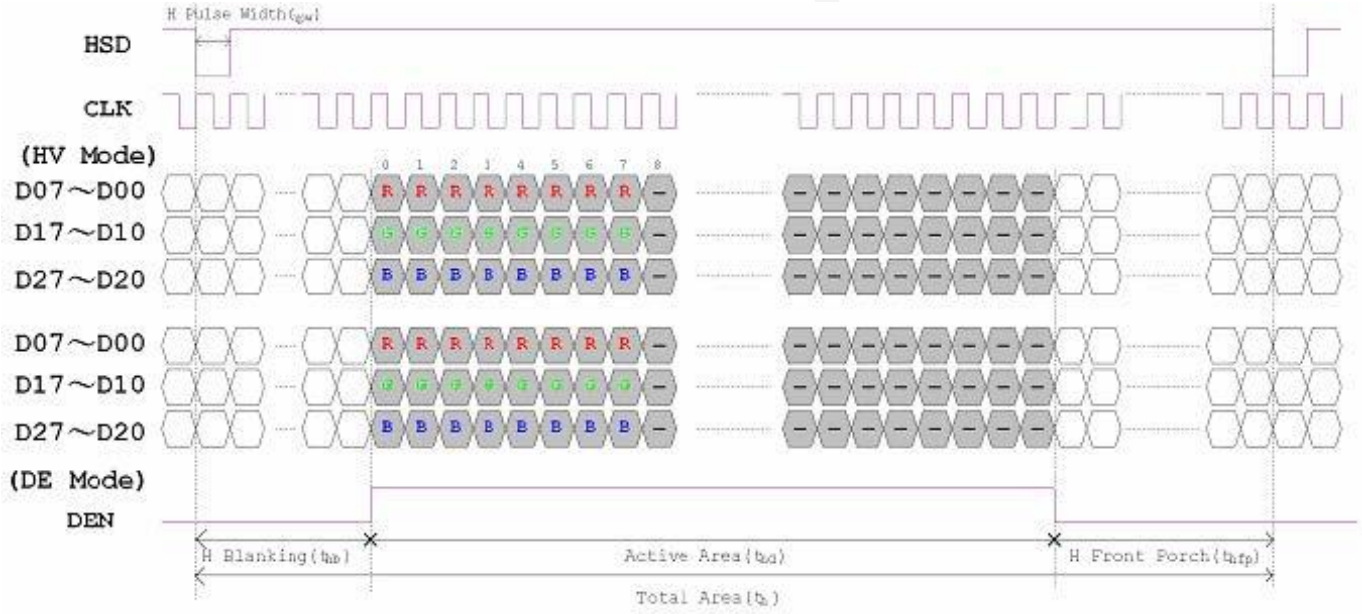
2.3.2. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

2.3.3. Timing Diagram





3. Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle		θL	CR≥10	60	70	-	degree	Note5
		θR		60	70	-		
		θT		40	50	-		
		θB		60	70	-		
Contrast Ratio		CR	θ=0° optimal	400	500	-	-	Note3
Response Time		T_R	Ta=25℃	-	10	20	ms	Note2
		T_F		-	15	30		
Color Chromaticity	White	x	θ=0°	-0.05	0.31	+0.05	-	Note6
		y			0.33			
	Red	x			-			
		y			-			
	Green	x			-			
		y			-			
	Blue	x			-			
		y			-			
Uniformity		U	θ=0°	70	75	-	%	Note7
Luminance		L	I_F=Typ.	160	200	-	cd/m^2	Note8

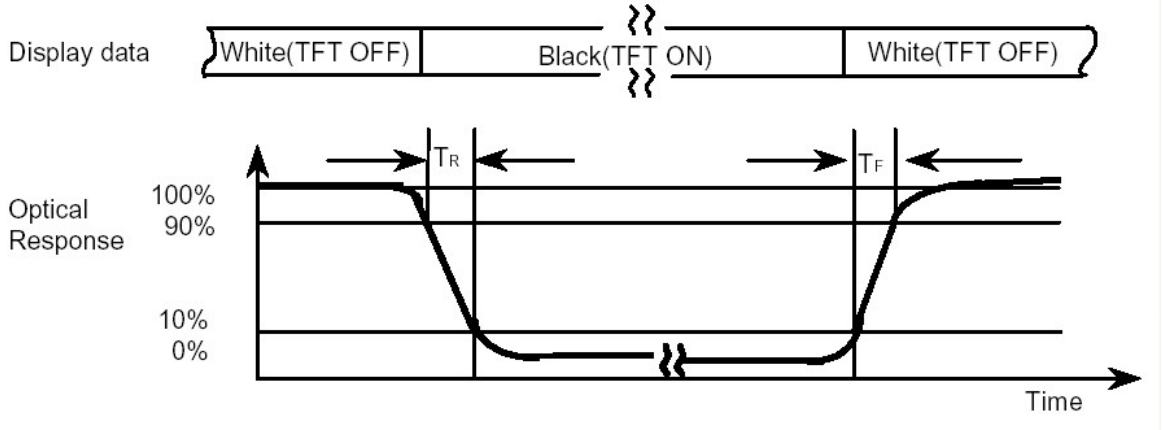
Note:

1. Test equipment setup

After stabilizing and leaving the panel alone at a given temperature for 30 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-5A with a viewing angle of 1 °at a distance of 50cm and normal direction.

2. Definition of response time: TR and TF

The figure below is the output signal of the photo detector.

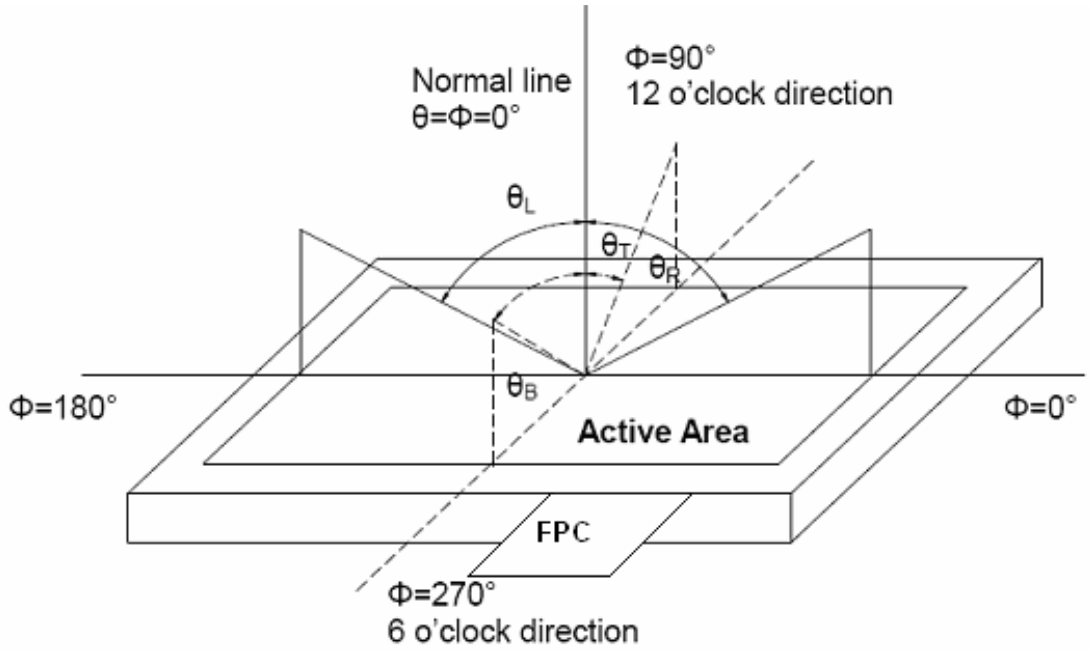


3.Definition of contrast ratio

$$CR = \frac{\text{Luminance with all pixel white}}{\text{Luminance with all pixel black}}$$

4.The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

5. Definition of viewing angle:



6. Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

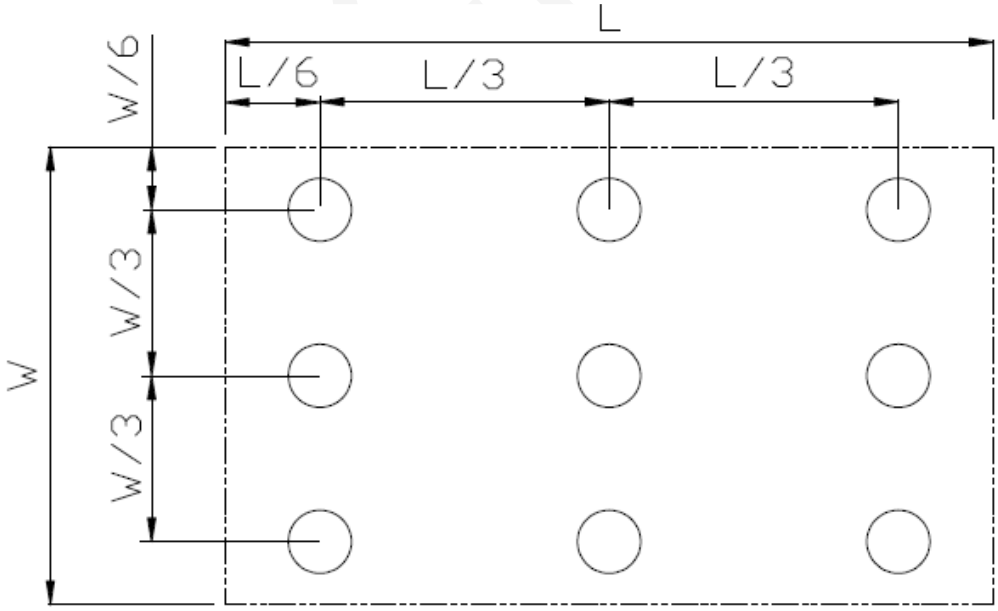
7. Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig.). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = Lmin / Lmax

L-------Active area length

W----- Active area width



Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

8. Definition of Luminance:

Measure the luminance of white state at center point.

4. Reliability

4.1. Reliability Condition

No.	Item	Condition	Remark
1	High temperature Operating	70℃, 240hrs	Finish product (With polarizer)
2	Low temperature Operating	-20℃, 240hrs	Finish product (With polarizer)
3	High temperature Storage	80℃, 240hrs	Finish product (With polarizer)
4	Low temperature Storage	-30℃, 240hrs	Finish product (With polarizer)
5	High temperature & Humidity Storage	80℃, 90%RH, 240hrs	Finish product (With polarizer)
6	Thermal Shock Storage (No operation)	-30℃, 30min. <=> 80℃,30min. 100 Cycles	Finish product (With polarizer)
7	ESD Test	Voltage: +8KV R:330Ω, C:150pF Air discharge, 10 times	Finish product (With polarizer)
8	Vibration Test	0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	Finish product (With polarizer)
9	Drop Test	Packed, 60cm free fall 1 corner, 3 edges, 6 surfaces	Finish product (With polarizer)

*One single product test for only one item.

* Judgment after test: keep in room temperature for more than 2 hours.

- Current consumption < 2 times of initial value
- Contrast > 1/2 initial value
- Function: work normally

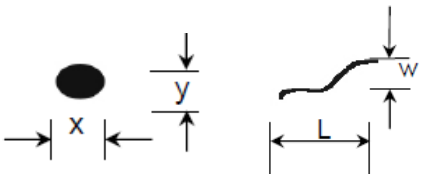
4.2. Inspection plan

Class	Item	Judgment	Class
Packing & Indicate	1.Outside and inside package	"Model no.", "lot no." and" quantity" should indicate on the package.	Minor
	2.Model mixed and quantity	Other model mixed ..... rejected. Quantity short or over ..... rejected.	Critical
	3.Product indication	"Model no." should indicate on the product	Major
Assembly	4.Dimension,LCD glass scratch and scribe defect	According to specification or drawing	Major
Appearance	5.Viewing area	Polarizer edge or LCD's sealing line is visible in the viewing area ..... rejected	Minor
	6.Blemish,black spot, white spot in the LCD and LCD glass cracks	According to standard of visual inspection (inside viewing area)	Minor
	7.Blemish,black spot White spot and scratch on the polarizer	According to standard of visual inspection (inside viewing area)	Minor
	8.Bubble in polarizer	According to standard of visual inspection (inside viewing area)	Minor
	9.LCD's rainbow color	Strong deviation color (or Newton ring) of LCD ..... rejected. Or according to limited sample (if needed, and inside viewing area)	Minor
	10.FPC	Burned area or wrong part number is on FPC. The symbol, character, and mark of FPC are unidentifiable. The stripped solder mask, A>1.0mm. 0.3mm < stripped solder mask or visible circuit, A<1.0mm,and the number is ≧4 pieces. Particle between circuits in solder mask. Circuit is peeled off or cracked. Any circuit risen or exposed. 0.2mm< Area of solder ball, A is ≦0.4mm,the number of solder ball is ≧3 pieces. The magnitude of solder ball, A is > 0.4mm.	Minor
Electrical	11.Electrical and optical characteristics (contrast, VOP, chromaticity etc.)	According to standard of visual inspection (inside viewing area)	Critical
	12.Missing pattern	Missing dot, line, character ..... rejected	Critical
	13.Short circuit, wrong pattern display	Non display, wrong pattern display, current consumption out of specification ..... rejected	Critical
	14.Pin hole, pattern deformity	According to standard of visual inspection	Minor
	15.Black spot, white spot, black line, white line, slant line, background uneven, color uneven	Strong deviation color ..... rejected Or according to limited sample full off screen (all black) ..... disregards	Minor
	16.Stick image (retention image)	Fixed test picture within two hours ..... rejected	Minor

4.3. Standard of visual inspection

<table>
<tr><th>Class</th><th>Item</th><th>Judgment</th></tr>
<tr><td>Minor</td><td>Blemish, black spot, white spot in the LCD.

Blemish, black spot, white spot and scratch on the polarizer.

Round type Line type</td><td>(A) Round type Unit: mm
<table><tr><td>Diameter (mm)</td><td>Acceptable Quantity</td></tr><tr><td>0.25 < A</td><td>0</td></tr></table>Note: A = (x + y)/2 (mm)

(B) Line type Unit: mm
<table><tr><td>Length</td><td>Width</td><td>Acceptable Quantity</td></tr><tr><td>-</td><td>W≦0.03</td><td>Acceptable</td></tr><tr><td>L<5</td><td>0.03<W≦0.07</td><td>3</td></tr><tr><td>L<5</td><td>0.03<W≦0.07</td><td>1</td></tr><tr><td>-</td><td>0.07<W</td><td>Follow round type</td></tr></table></td></tr>
<tr><td>Minor</td><td>Bubble in polarizer</td><td>Unit: mm
<table><tr><td>Diameter (mm)</td><td>Acceptable Quantity</td></tr><tr><td>A < 0.3</td><td>Acceptable</td></tr><tr><td>0.3 < A < 0.5</td><td>1</td></tr><tr><td>0.5 < A</td><td>0</td></tr></table></td></tr>
<tr><td>Minor</td><td>Pin hole, Pattern deformity</td><td>Unit: mm
<table><tr><td>Diameter (mm)</td><td>Acceptable Quantity</td></tr><tr><td>0.4 < A</td><td>0</td></tr></table></td></tr>
</table>

5. Precautions

5.1. Handling Precautions

(1) Protect the panel from static, it may cause damage to the CMOS Gate Array IC.

(2) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(3) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

(4) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Don't use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(5) Pins of I/F connector shall not be touched directly with bare hands.

(6) Refrain from strong mechanical shock and / or any force to the panel. In addition to damage, this may cause improper operation or damage to the panel.

(7) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a B pencil lead.

(8) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.

(9) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

5.2. Storage Precautions

(1) Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the panel with temperature from 0 to 35℃ and relative humidity of less than 70%.

(2) The panel shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

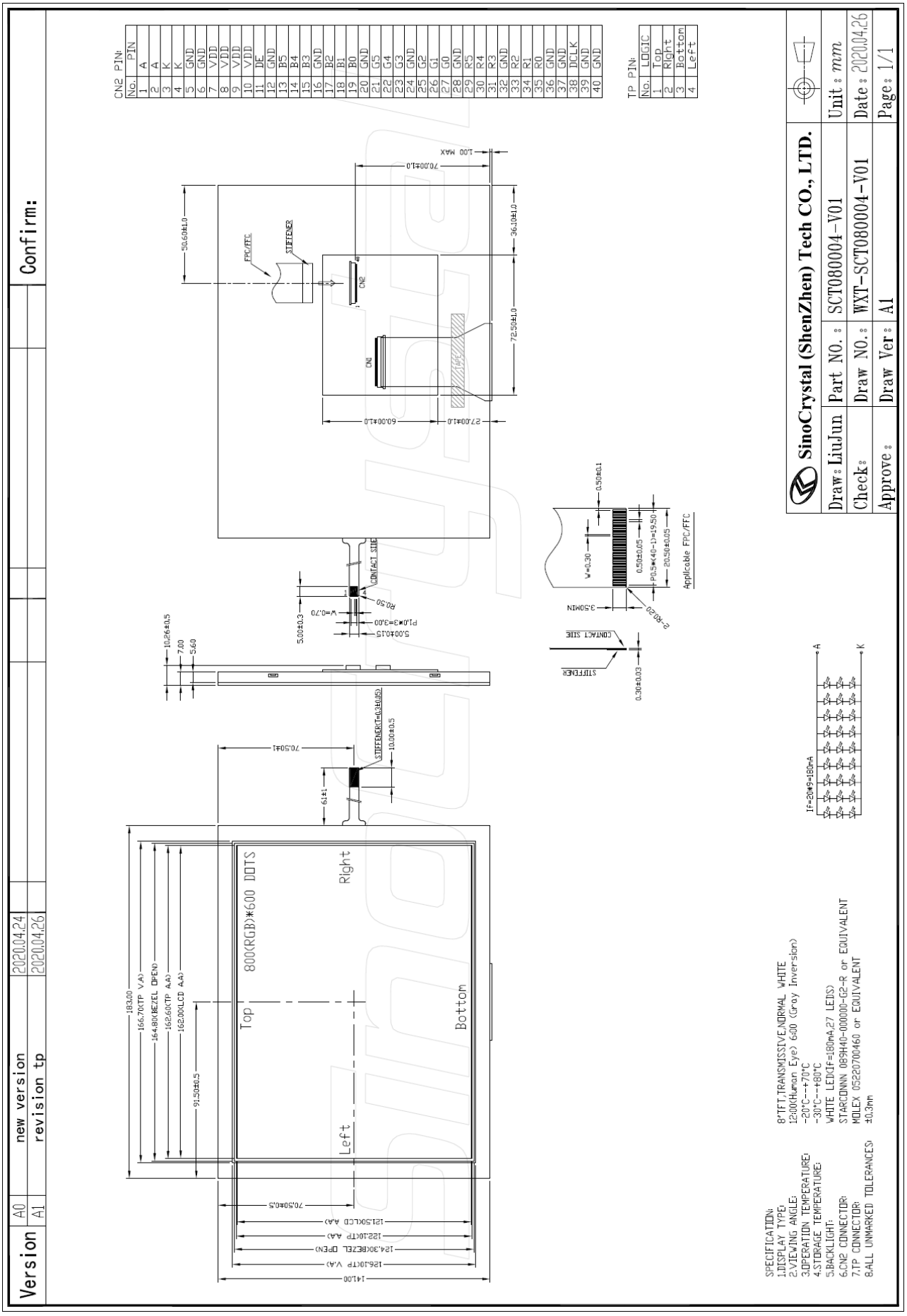
5.3. Operation Precautions

(1) The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.

(2) Do not exceed the absolute maximum rating value. (the supply voltage variation, Input voltage variation in part contents and environmental temperature and so on). Otherwise the panel may be damaged.

(3) If the panel displays the same pattern continuously for a long period of time, it can be the situation when the image" Sticks" to the screen.

6. Outline Dimension



7. Packing method

7.1. Packing Quantity

TBD.

7.2. Flowing chart

TBD.