Shenzhen Rogin Electronics Co.,Ltd.

SPECIFICATION

Revision:　A

Product Model:　　RXO24A-03

Designed by	R&D Checked by	Quality Department by	Approved by

Approval by Customer

OK

NG，Problem survey:

Approved By _____

1. If there is no special request from customer, Shenzhen Rogin Electronics Co.,Ltd. Will not reserve the tooling of the product under the following conditions:
　　1.1 There is no response from customer in one year after Shenzhen Rogin Electronics Co.,Ltd..　Submit the samples;
　　1.2 There is no order in one year after the latest mass production.
2. All correlated data (include quality record) will be reserved one year more after tooling was discarded.
3. If there is no special request from customer, The product of Shenzhen Rogin Electronics Co.,Ltd.. Will repair only one year.
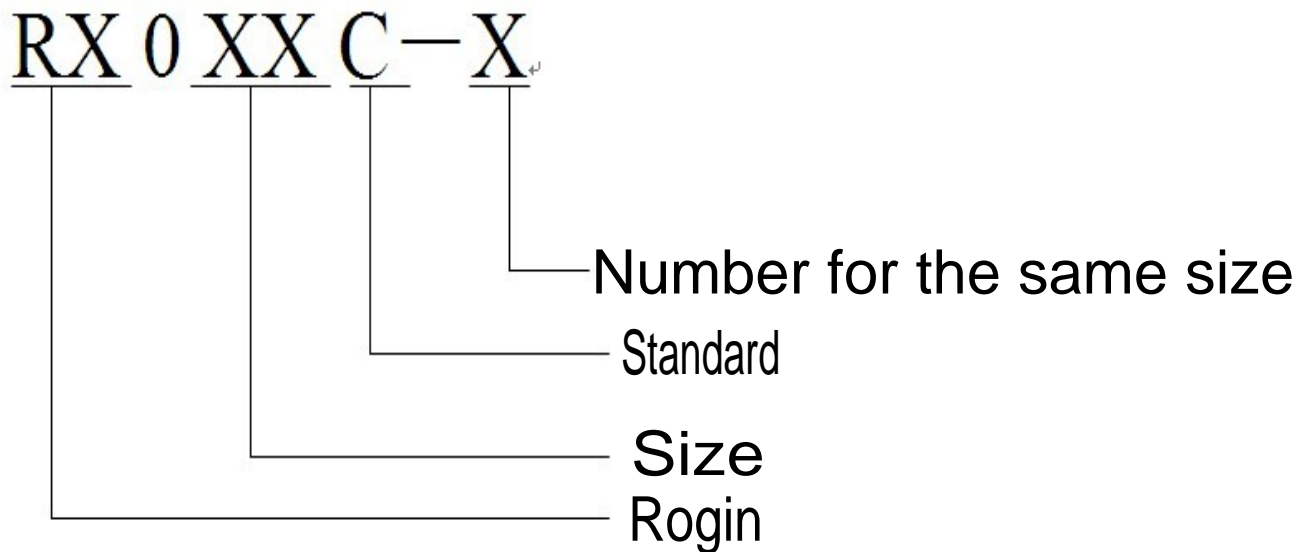
Revision Record

VEV NO.	REV DATE	CONTENTS	Note
A	2010-10-26	NEW ISSUE	

Table Of Contents

1. Numbering System

RX 0 XX C－X

Number for the same size

Standard

Size

Rogin

2. General Iinformation

ITEM	STANDARD VALUES	UNITS
LCD type	2.4"TFT	--
Dot arrangement	480×234	dots
Driver IC	OTA5182A	--
Module size	55.2(W)×47.55(H)×2.90(T)	mm
Active area	48.00(W)×35.685(H)	mm
Dot pitch	0.3 (W)×0.1525 (H)	mm
Back Light	4 White LED In Parallel	--
Weight	TBD	g

3. External Dimensions

Specifications:
1. Display Type: TFT
2. Viewing Angle: 6 O'clock
3. Drive   IC : OTA5182A
4. Top -20℃~+70℃, Tst: -30℃~+80℃;
5. Connector: COG+FPC
6. Backlight: 1 Chip White LEDS Side Backlight

47.15±0.2   3.15
35.69LCD AA
48LCD AA
54.8±0.2
28.00±0.5
480P×234
4.00±0.5

2.85MAX

23.74

FH19S-40S-0.5SH

Mod.Name   RX024A-3
PART.Name

Customer No.:
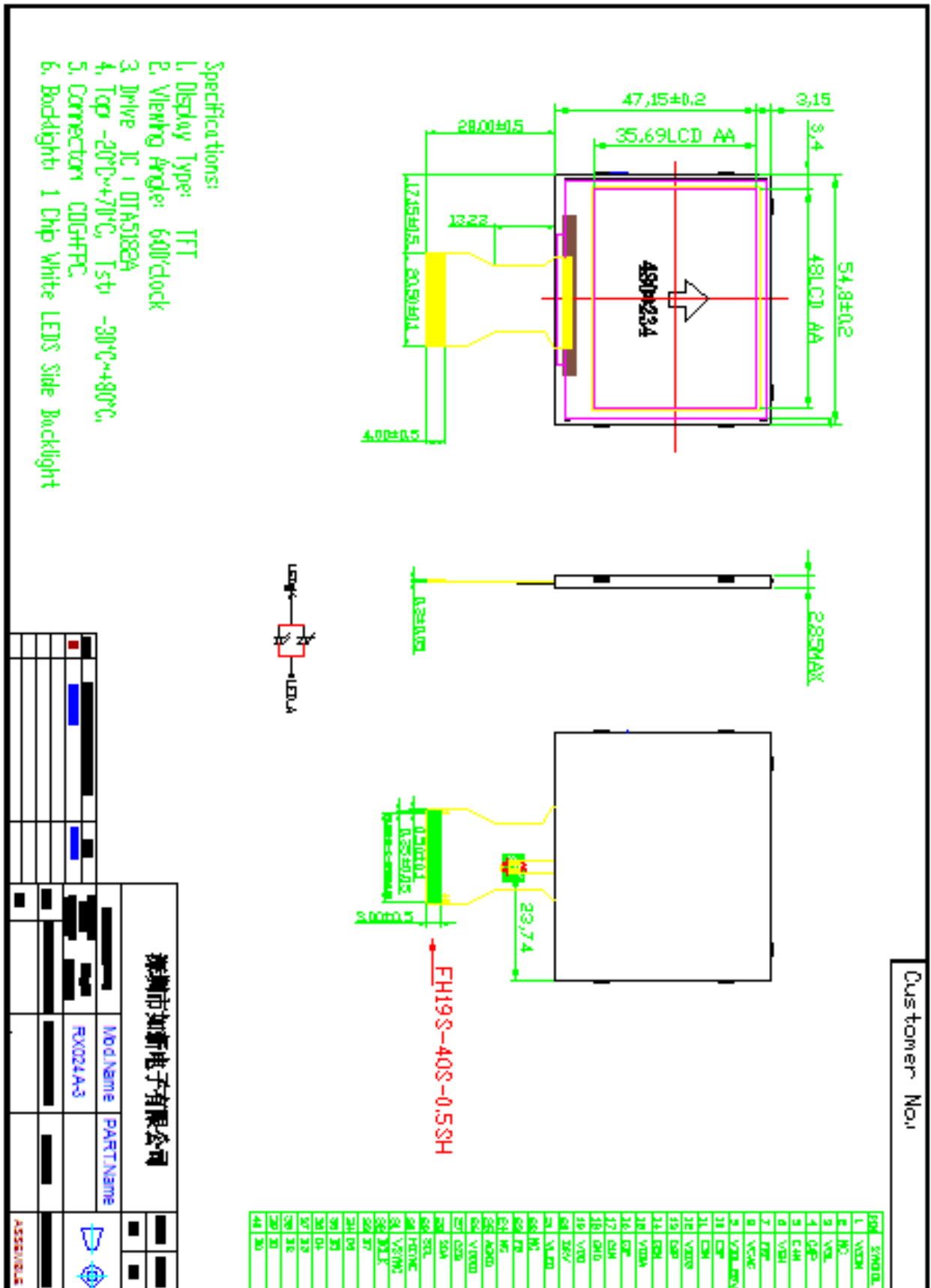
4. Interface Description

PIN NO.	PIN NAME	DESCRIPTION	Remark
1	VCOM	Common electrode driving voltage.	Note1
2	NC	--	
3	VGL	Power supply for gate off voltage.	
4	C4P	Pins to connect capacitance for power circuitry.	
5	C4N	Pins to connect capacitance for power circuitry.	
6	VGH	Power supply for gate on voltage.	
7	FRP	Frame polarity output for VCOM.	
8	VCAC	Define the amplitude of the VCOM swing.	
9	VDD_25V	Intermediate voltage for charge Pump.Please connect the capacitor between VDD_25V and GND.	Note2
10	C3P	Pins to connect capacitance for power circuitry.	
11	C3N	Pins to connect capacitance for power circuitry.	
12	VDD3	Charge-pump circuit reference voltage. Please connect the capacitor between VDD3 and GND.	
13	C2P	Pins to connect capacitance for power circuitry.	
14	C2N	Pins to connect capacitance for power circuitry.	
15	VDDA	Power supply voltage of source driver liquid crystal drive circuit. Please connect the capacitor between VDDA and GND.	
16	C1P	Pins to connect capacitance for power circuitry.	
17	C1N	Pins to connect capacitance for power circuitry.	
18	GND	Power ground	
19	VDD	Power supply for analog circuit blocks (2.4 ~ 3.3 V)	Note3
20	DRV	Gate signal for the power transistor of the boost converter	Note4
21	VLED	Supply voltage for LED backlight	
22	NC	--	
23	FB	Main boost regulator feedback input	Note5
24	NC	--	
25	AGND	Power ground	
26	VDDIO	Power supply for interface logic circuits (1.65 ~ 3.3V)	Note3
27	CSB	Serial communication chip select ("Low" enable).	
28	SDA	Serial communication data input.	
29	SCL	Serial communication clock input.	
30	HSYNC	Line synchronizing signal for RGB interface operation.	Note6
31	VSYNC	Frame synchronizing signal for RGB interface operation.	Note7
32	DCLK	Dot clock signal for RGB interface operation.	Note8
33	D7	Data Input	
34	D6	Data Input	
35	D5	Data Input	
36	D4	Data Input	
37	D3	Data Input	
38	D2	Data Input	
39	D1	Data Input	
40	D0	Data Input	

Note1:VCOM=+5.0 Vp-p.(Typ.)

Note2: The external capacitor is required on those pins as following.

Note : (1) Value of wiring resistance at pins except VDD, GND, C1P~C4N must be ＜7ohm

(2) Suggestion Capacitors value and types

Capacitor no.	Withstanding voltage(V)	CAP (uF)	Cap. Type
C1,C5,C9,C10	10	1 to 4.7	X5R/Y5V
C2,C3,C6,C7	16	1 to 4.7	X5R/Y5V
C4	25	1 to 4.7	Only X5R
		2.2 to 4.7	X5R/Y5V
C8	25	0.47 to 4.7	X5R/Y5V
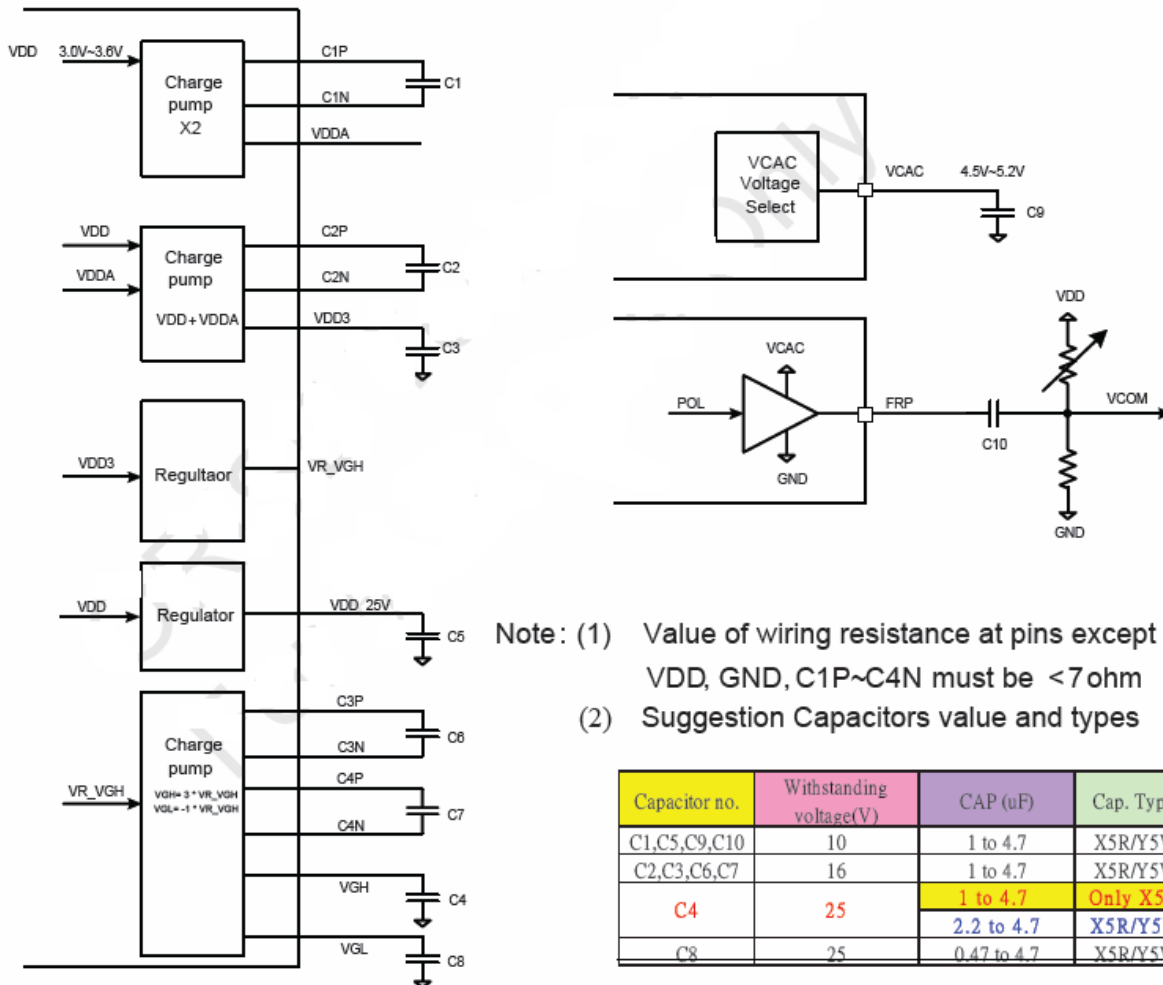
Note3: VDD, VDDIO=+3.3V (Typ.)

Note4: Outputs the control signal of switching regulator for LED. Duty cycle varies according to FB input voltage

Note5: Feedback signal of switching signal for LED. It controls DRV output duty cycle with 0.6V input level sense.

Note6: Horizontal sync signal, it is a "L "active signal.

Note7: Vertival sync signal, it is a "Low "active signal.

Note8: Dot clock signal for RGB interface, timing for data loading defined at rising edge.

5.Absolute Maximum Ratings.

Parameter	Symbol	Unit	Rating
Logic supply	VDDIO	V	-0.5 to +6
Analog supply	VDDA	V	-0.5 to +6
Power supply	VDD	V	-0.5 to +6
Input Voltage	Others	V	-0.3 to VDDIO+0.3
Output Voltage	S1~ S480	V	-0.3 to VDDA+0.3
	Others	V	-0.3 to VDDIO+0.3
Operating Temperature	T_{OPR}	°C	-30 to +85
Storage Temperature	T_{STG}	°C	-55 to +100

6. DC Characteristics.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Analog Operating Voltage		VCC	-	3.0	3.3	3.6	V
Logic Operating Voltage		IOVCC	-	1.8	3.3	3.6	
Input Voltage	H level	V_{IH}	-	0.7*IOVCC	-	IOVCC	V
	L level	V_{IL}		GND	-	0.3*IOVCC	
Output Voltage	H level	V_{OH}	-	IOVCC-0.4	-	IOVCC	V
	L level	V_{OL}		GND	-	GND+0.4	

7.Timing Characteristics.
7.1 Serial Interface Timing Characteristics
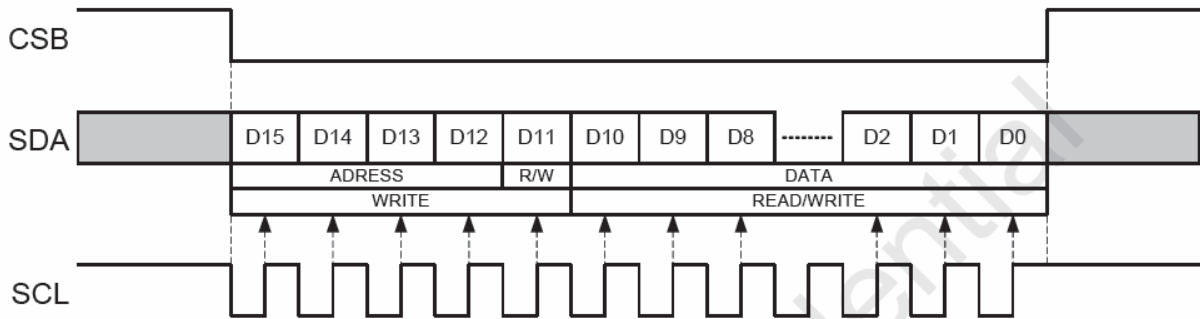
7.2 Parallel RGB Interface Timing Characteristics
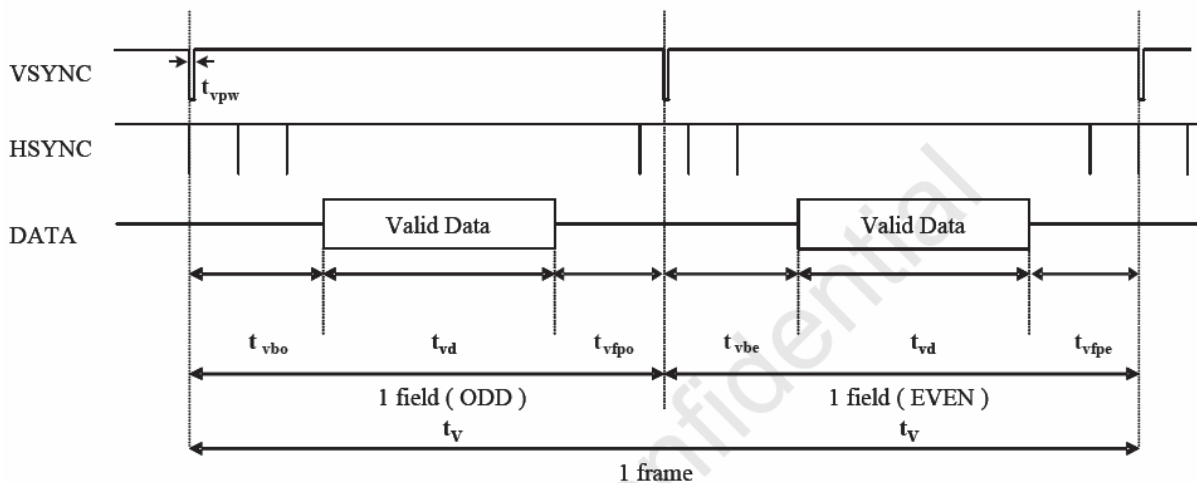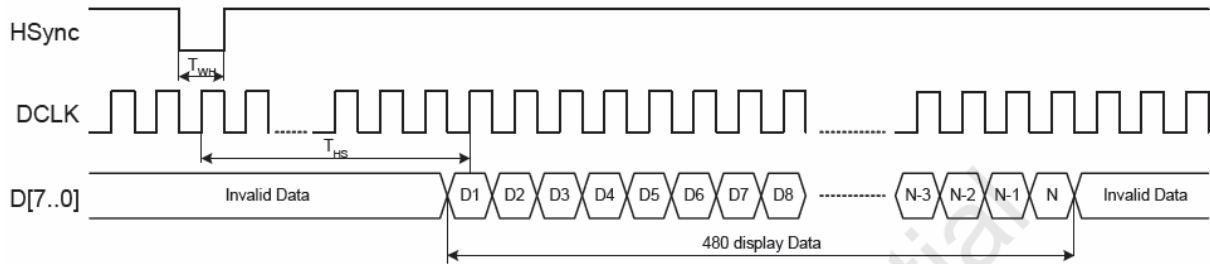
Parameter		Symbol	Interlace			(*)Non-Interlace			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Vertical display area		t_{vd}		240			240		H
VSYNC period time		t_v	247.5	262.5	277.5	247	262	277	H
VSYNC pulse width		t_{vpw}	1 DCLK	1H	6H	1 DCLK	1H	6H	
(*)VSYNC Blanking (t_{vb})	Odd field	t_{vbo}	6	13	21	6	13	21	H
	Even field	t_{vbe}	6.5	13.5	21.5				
VSYNC Front porch (t_{vfp})	Odd field	t_{vfpo}	1.5	9.5	16.5	1	9	16	H
	Even field	t_{vfpe}	1	9	16				

8. Backlight Charasterics.

VLED ○—▷|—◁|—○ GND
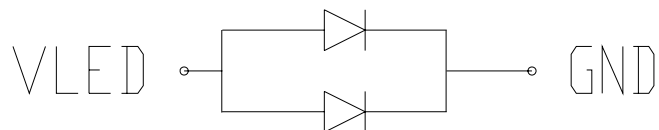
| Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition	Note
Supply Voltage	**Vf**	**3.0**	**3.2**	**3.4**	**V**	**If=30 mA**	**-**
Supply Current	**If**	**-**	**30**	**40**	**mA**	**-**	**-**
Reverse Voltage	**Vr**	**-**	**-**	**5**	**V**	**15uA**	
Power dissipation	**Pd**	**-**	**250**	**-**	**mW**	**-**	
Luminous Intensity for LCM		**-**	**200**	**-**	**Cd/m^2**	**If=30 mA**	
Uniformity for LCM	**-**	**80**	**-**	**-**	**%**	**If=30 mA**	
Life Time	**-**	**50000**	**-**	**-**	**Hr**	**If=30 mA**	**-**
Backlight Color				**White**			

9.Optical Characteristics

(Note1，Note2)

(Using CPT LC+ **EWV** Polarizer+Corresponding Backlight, reference only)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Transmittance		T			(8.5)		%	
Contrast Ratio		CR	*1)		(400)	-	--	Note 3
Response Time		Tr+ Tf	*3)	-	(30)		ms	Note 4
Viewing Angle	Vertical (U/D)	θ*2)			(50)			Note 5
					(65)			
	Horizontal (L/R)	ψ*2)			(65)			
					(65)			
Color Filter Chromacicity	White	x y Y		(0.282) (0.327) (35.2)	(0.302) (0.347) (38.2)	(0.322) (0.367) (41.2)		Note 6
	Red	x y Y		(0.593) (0.311) (18.4)	(0.613) (0.331) (21.4)	(0.633) (0.351) (24.4)		
	Green	x y Y		(0.298) (0.529) (61.4)	(0.318) (0.549) (65.4)	(0.338) (0.569) (69.4)		
	Blue	x y Y		(0.132) (0.170) (24.8)	(0.152) (0.190) (27.8)	(0.172) (0.210) (30.8)		
	NTSC		-		(44.9%)			

Note.1 Ambient condition：25℃±2℃，60±10%RH，under 10 Lunx in the darkroom。
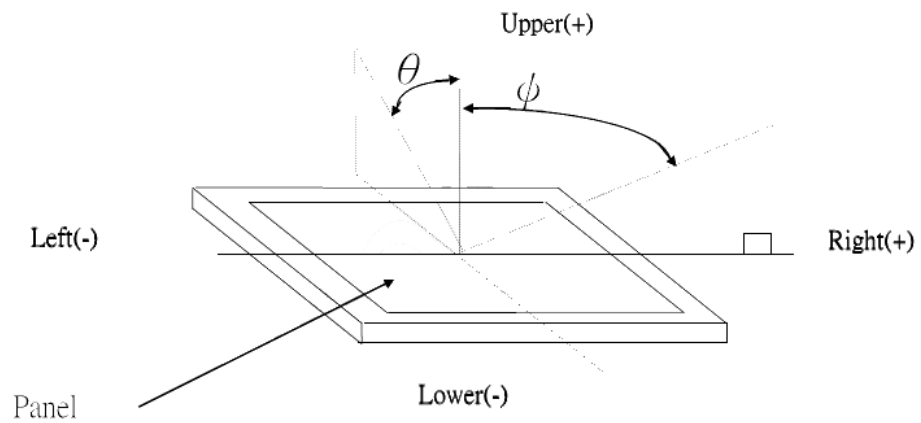
Note.2 Measure device：BM-5A (TOPCON)，viewing cone=１°，I_L=20mA。
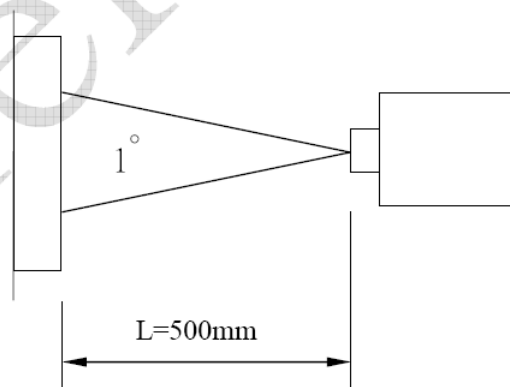
Note.3 Definition of Contrast Ratio：

CR = White Luminance (ON) / Black Luminance (OFF)

Note.4 Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.
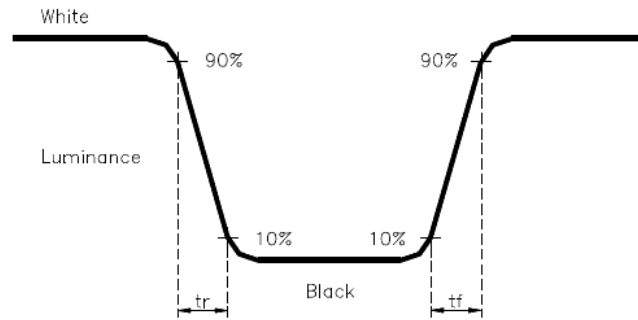
Note.5 Definition of view angle(θ，ψ)：

Note.6 Light source: C light.

10. Reliability Test Conditions And Methods

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	80℃±2℃×200Hours	Inspection after 2~4hours storage at room temperature,the samples should be free from defects: 1,Air bublle in the LCD. 2,Sealleak. 3,Non-display. 4,Missing segments. 5,Glass crack. 6,Current IDD is twice higher than initial value. 7,The surface shall be free from damage. 8,The electric charateristic requirements shall be satisfied.
②	Low Temerature Storage	– 30℃±2℃×200Hours	
③	High Temperature Operating	70℃±2℃×120Hours	
④	Low Temperature Operating	– 20℃±2℃/120Hours	
⑤	Temperature Cycle(Storage)	– 30℃±2℃ ⟺ 25℃ 80℃±2℃ (30min) (5min) (30min) 1cycle Total 10cycle	
⑥	Damp Proof Test	50℃±5℃×90%RH×120Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
⑨	ESD Test	Voltage: ± 8KV,R:330Ω ,C:150PF,Air Mode,10times	

REMARK:
1,The Test samples should be applied to only one test item.
2,Sample side for each test item is 5~10pcs.
3,For Damp Proof Test,Pure water(Resistance＞10MΩ）should be used.
4,In case of malfunction defect caused by ESD damage,if it would be recovered to normal state after resetting,it would be judge as a good part.
5,EL evaluation should be excepted from reliability test with humidity and temperature:Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
6,Failure Judgment Criterion:Basic Specification Electrical Characteristic,Mechanical Characteristic,Optical Characteristic.

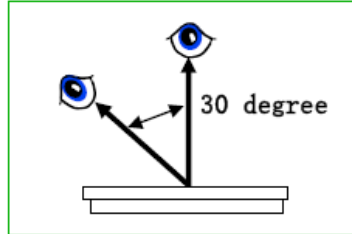# 11.Inspection Standard

This standard apply to TFT module specification.

1. Inspection condition:

   Under daylight lamp 20～40W，product distance inspector'eye 30cm,incline degree 30° 。

30 degree

2. Inspection standard

NO.	Item	Inspection standard	Rate
2.1	**Dot**	Case of Dot defect is below ① Bright Dot (whit spot) : "0" ② Dark Dot (black spot) : "0" (In case of Dark Dot on Main TFT LCD) - NG if there's full Dot defect. - Damaged less than the size of sub-pixel is not counted as defect - Dots darker than the size of sub-pixel are not defined as bright dot defect	minor

size（mm） area	Acceptable number
Φ≤0.10	ignore
0.10＜Φ≤0.15	3
0.15＜Φ≤0.20	2
0.25＜Φ≤0.25	1
0.25＜Φ	0

| 2.2 | line |

Size（mm）		Acceptable number
ignore	W≤0.03	ignore
L≤4.0	0.03＜W≤0.04	2
L≤4.0	0.04＜W≤0.05	1
	0.05＜W	Treat with dot non-conformance

12. Handling Precautions

12.1 Mounting method

The LCD panel of SC LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent
[recommended below] and wipe lightly
- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:
- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated:
- Soldering flux
- Chlorine (CI) , Salfur (S)

If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Salfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

12.4 packing

- Module employ LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.
Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

● Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
● Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
● Storing with no touch on polarizer surface by the anything else.
  [It is recommended to store them as they have been contained in the inner container at the time of delivery from us

12.7 Safety

● It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
● When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

13. Precaution For Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

● When a question is arisen in this specification
● When a new problem is arisen which is not specified in this specifications
● When an inspection specifications change or operating condition change in customer is reported to GT LCD , and some problem is arisen in this specification due to the change
● When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

14 Packing Method