SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
MODEL	**SC1602013-V06**
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
Zane.Lau	Lr.Yin	Wf.Luo

RECORDS OF REVISIONS

Version	Content	Date
A0	First Issue	2022-02-25

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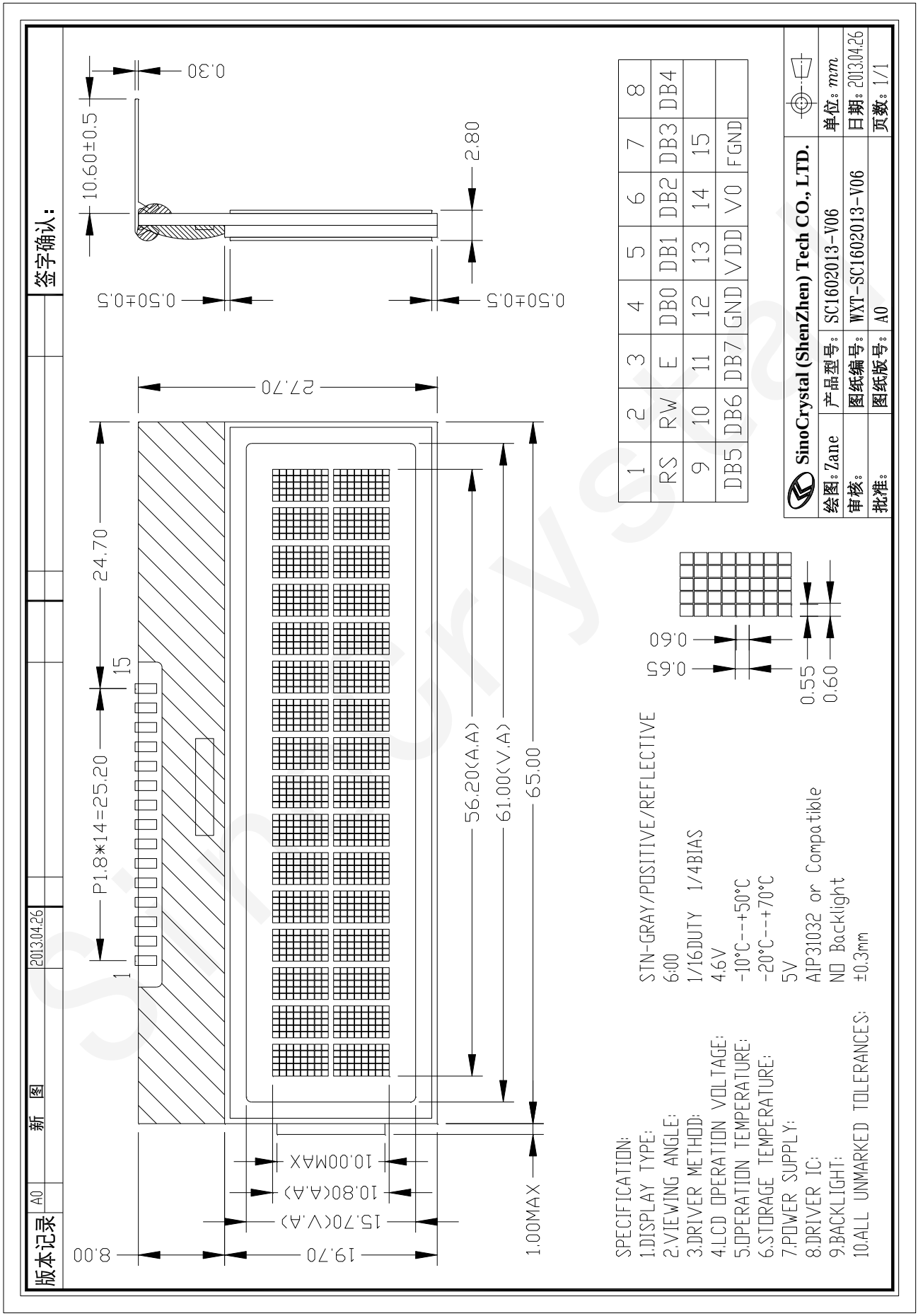
1. General Specification

Item	Contents	Unit
LCD Size	2.25	inch
Number of Characters	16 × 2	dots
Module Size (W×H×T)	65.0 × 19.7 × 2.8	mm
Viewing Area (W×H)	61.0 × 15.7	mm
Active Area (W×H)	56.20 × 10.8	mm
Dot Size	0.55 × 0.60	mm
Dot Pitch	0.60 × 0.65	mm
LCD Type	STN, Gray, Positve, Reflective	-
Driver Scheme	1/16 Duty 1/5 Bias	-
Viewing Direction	6 o'clock	-
Backlight Type	None	-
Backlight Color	-	-
LCD Controller/Driver	AIP31032 or Compatible	-
Interface	8-bit/4-bit MCU	-
Weight	TBD	g

2. Outline Dimension



3. Interface Pin Description

Pin No.	Symbol	Type	Description
1	RS	I	Register selection input. When RS = “High”, Data register is selected. When RS = “Low”, Instruction register is selected.
2	RW	I	Read/write selection input. When RW = “High”, read operation. When RW = “Low”, write operation.
3	E	I	Read/write enable signal
4-11	DB0-DB7	I/O	Data bus
12	GND	P	Power Gound
13	VDD	P	Supply voltage for logic
14	V0	P	Supply voltage for LCD. Contrast adjustment.

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

4. Electrical Characteristics

4.1. Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Remark
Power Supply for Logic	VDD	-0.3	5.5	V	
Power Supply for LCD	V0	-0.3	7	V	
Input Signal Voltage	V_{IN}	-0.3	VDD+0.3	V	Note 1
Operating Temperature	T_{OPR}	-20	+70	℃	Ambient
Storage Temperature	T_{STG}	-30	+80	℃	Ambient

Note1: VIN represent IO

4.2. DC Electrical Characteristics

4.2.1. Driving LCD Panel

VSS=0V, Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Operating Voltage	VDD	2.7	5.0	5.5	V	
Logic High level input voltage	V_{IH}	0.8VDD	-	VDD	V	
Logic Low level input voltage	V_{IL}	0	-	0.2VDD	V	
Logic High level output voltage	V_{OH}	0.75VDD	-	VDD	V	I_{OH}=-1.0mA
Logic Low level output voltage	V_{OL}	0	-	0.2VDD	V	I_{OL}=1.0mA
Voltage for LCD	V0	-	-	-	V	T_{OPR}= 0℃
		-	4.6	-	V	T_{OPR}=25℃
		-	-	-	V	T_{OPR}=50℃
Power Consumption	I_{DD}	-	-	2	mA	

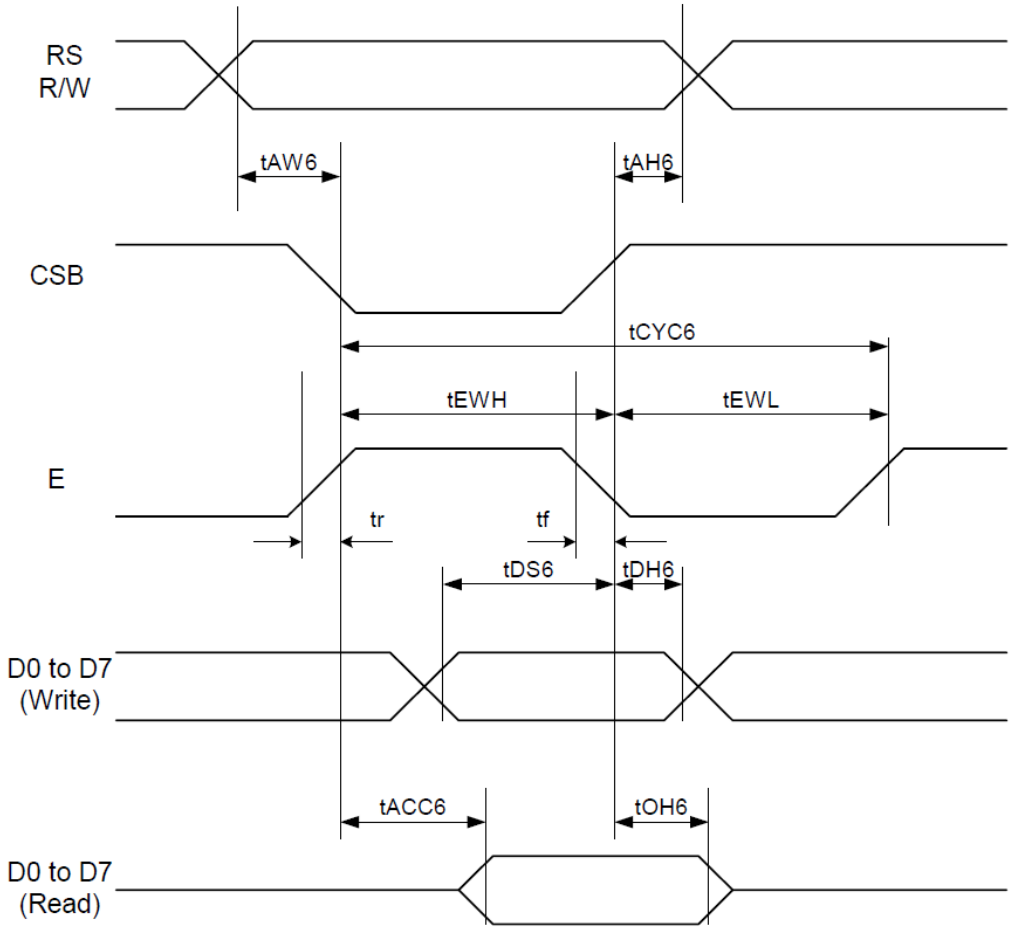
4.2.2. Driving Backlight

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I_F	-	-	-	mA	
Forward Current Voltage	LEDA-LEDK	-	-	-	V	
Operating Life Time	-	-			hrs	

4.3. AC Electrical Characteristics

4.3.1. System Bus Timing for MPU



(Ta = 25°C)

Item	Signal	Symbol	Condition	VDD=2.7 to 4.5V Rating		VDD=4.5 to 5.5V Rating		Units
				Min.	Max.	Min.	Max.	
Address hold time	RS	t_{AH6}	—	20	-	20	-	ns
Address setup time	RS	t_{AW6}		20	-	20	-	
System cycle time	RS	t_{CYC6}	—	400	-	280	-	ns
Data setup time	D0 to D7	t_{DS6}	—	100	-	80	-	ns
Data hold time	D0 to D7	t_{DH6}		40	-	20	-	
Access time	D0 to D7	t_{ACC6}	C_L = 100 pF	-	500	-	400	ns
Output disable time	D0 to D7	t_{OH6}		300	-	150	-	
Enable Rise/Fall time	E	tr,tf	—	-	20	-	20	ns
Enable H pulse time	E	t_{EWH}	—	200	-	120	-	ns
Enable L pulse time	E	t_{EWL}	—	150	-	130	-	ns

Note: All timing is specified using 20% and 80% of V_{DD} as the reference.

Note: CSB have been connected to GND

5. Optical Characteristics

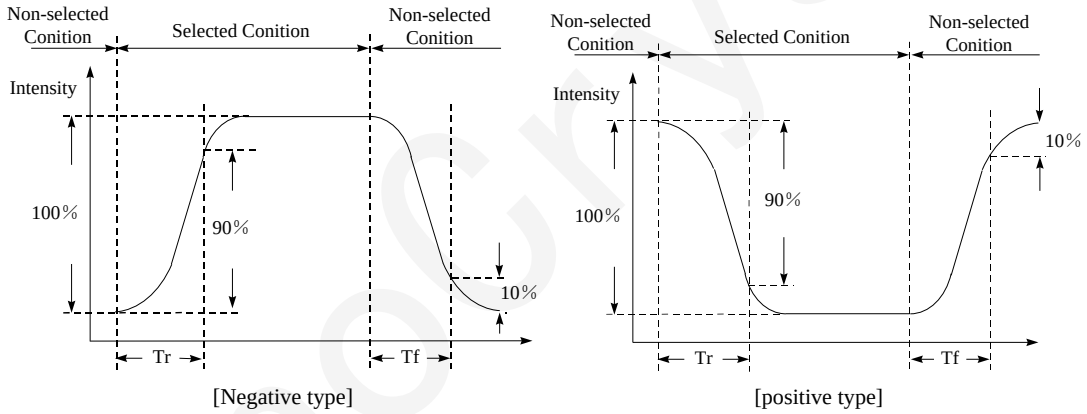
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle	θ_T (12:00)	CR≥1.1		30	-	degree	Note4
	θ_B (6:00)			45	-		
	θ_L (9:00)			30	-		
	θ_R (3:00)			30	-		
Contrast Ratio	CR	θ=0° optimal	-	5.4	-	-	Note3
Response Time	T_R	Ta=25℃	-	112	-	ms	Note2
	T_F		-	250	-		
Uniformity	U	θ=0°	-	-	-	%	Note6
Luminance	L	I_F=Typ.	-	-	-	cd/m^2	Note7

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-7 with a viewing angle of 1° at a distance of 50cm and normal direction.

2. Definition of response time: T_R and T_F



Conditions:

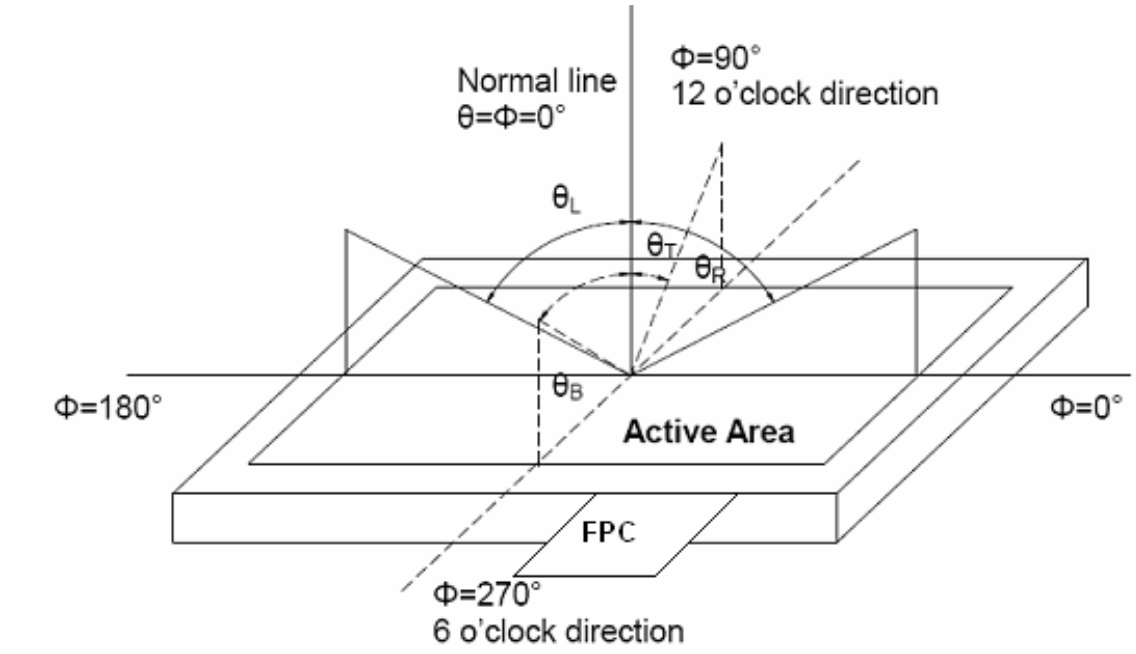
Operating Voltage: V_{OP} Viewing Angle (θ, φ): 0°, 0°

Frame Frequency: 64 Hz Driving Wave form: 1/N duty, 1/a bias

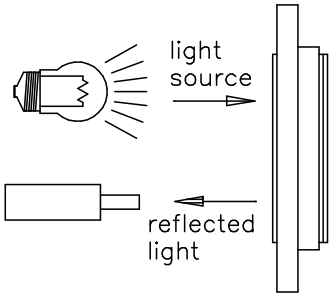
3.Definition of contrast ratio

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

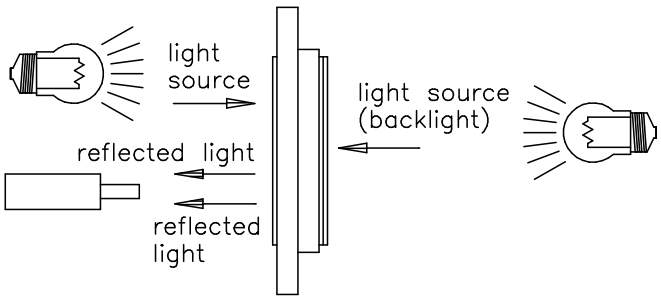
4. Definition of viewing angle:



5. Description of Measuring Equipment



Reflective type



Transflective type

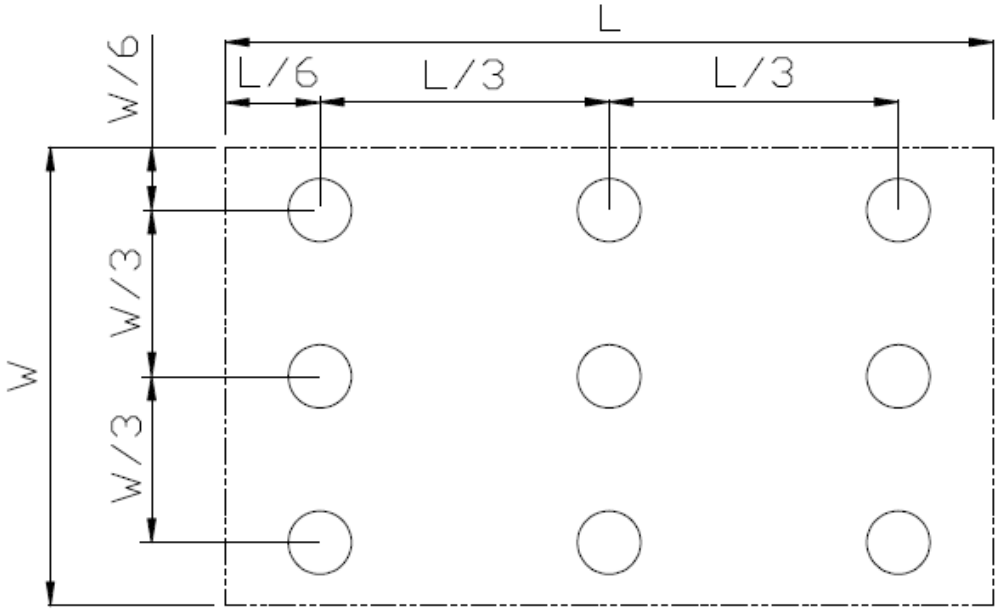
6. Definition of Luminance Uniformity

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) = L_{MIN} / L_{MAX}

L-------Active area length

W----- Active area width



L_{MAX}: The measured maximum luminance of all measurement position.

L_{MIN}: The measured minimum luminance of all measurement position.

7. Definition of Luminance:

Measure the luminance of white state at center point.

8. Test conditions and methods:

Temperature: 25±5℃

Humidity: 65±10% RH

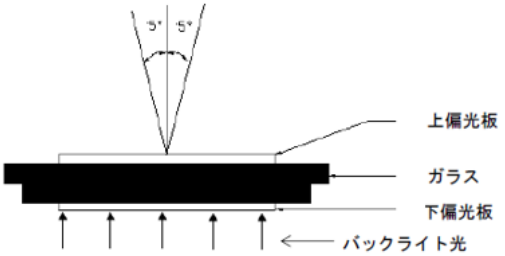
LCD is ON state:

The visual inspection is carried out with naked eyes from the position about 30cm away from the LCD module under a single fluorescent lamp (20W) about 50cm away from the LCD module.

Inspection angle is the angle direction specified in this specification (4 directions of 12:00 / 6:00 / 3:00 / 9:00)

Defects that look bad due to surface gloss will not be investigated.

The driving condition of LCD module is the typical value of this specification.



Visual inspection at 30-40cm distance.

Visual angle direction of appearance inspection: up, down, left and right 5 degrees

For scratches / foreign bodies / cracks (non electrified appearance), black spots and bright spots (electrified appearance), etc.

For the perspective of photoelectric characteristics, please refer to the requirements of photoelectric characteristics.

6. Operating Principles & Methods

6.1. Instruction Table

(AIP31032 support 2 command mode, SC1602013 is Normal mode, EXT have been connected to VDD)

➢ **instruction table at "Normal mode"**

(When "EXT" option pin connect to VDD, the instruction set follow below table)

Instruction	Instruction Code										Description	Instruction Execution Time		
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		OSC= 380KHz	OSC= 540kHz	OSC= 700KHz
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC	**1.08 ms**	**0.76 ms**	**0.59 ms**
Return Home	0	0	0	0	0	0	0	0	1	x	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	**1.08 ms**	**0.76 ms**	**0.59 ms**
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	**26.3 us**	**18.5 us**	**14.3 us**
Display ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1:entire display on C=1:cursor on B=1:cursor position on	**26.3 us**	**18.5 us**	**14.3 us**
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	x	x	S/C and R/L: Set cursor moving and display shift control bit, and the direction, without changing DDRAM data.	**26.3 us**	**18.5 us**	**14.3 us**
Function Set	0	0	0	0	1	DL	N	x	x	x	DL: interface data is 8/4 bits N: number of line is 2/1	**26.3 us**	**18.5 us**	**14.3 us**
Set CGRAM	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter	**26.3 us**	**18.5 us**	**14.3 us**
Set DDRAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	**26.3 us**	**18.5 us**	**14.3 us**
Read Busy flag and address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	**0**	**0**	**0**
Write data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM)	**26.3 us**	**18.5 us**	**14.3 us**
Read data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM)	**26.3 us**	**18.5 us**	**14.3 us**

NOTE: For more detail information, please refer to the Driver IC specification.

6.2. Character Generator ROM

7. Reliability

7.1. Reliability Condition

Environmental Test				
No.	**Test Item**	**Contents of Test**	**Test Condition**	**Applicable Standard**
1	High temperature storage	Endurance test applying the high storage temperature for a long time.	80 °C 200 hrs	-
2	Low temperature storage	Endurance test applying the low storage temperature for a long time.	-30 °C 200 hrs	-
3	High temperature operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70 °C 200 hrs	-
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time.	-20 °C 200 hrs	-
5	High temperature / Humidity storage	Endurance test applying the high temperature and high humidity storage for a long time.	70 °C , 90 %RH 96 hrs	MIL-202E-103B JIS-C5023
6	High temperature / Humidity operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	50 °C , 90 %RH 96 hrs	MIL-202E-103B JIS-C5023
7	Temperature cycle	Endurance test applying the low and high temperature cycle. -20°C 30min ⇌ 20°C 5min. ⇌ 70°C 30min 1 cycle	-20°C / 70°C 10 cycles	-
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using. (Packing condition)	Frequency:10~55~10Hz Amplitude:1.5mm, X, Y, Z direction for total 3hours	MIL-202E-201A JIS-C5025 JIS-C7022-A-10
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G half sine wave 8.8 ms 3 times of each direction	MIL-202E-213B
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115 mbar 40 hrs	MIL-202E-105C
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	V=800V , R=1.5 kΩ CS=100 pF 10 time	MIL-883B-3015.1

Inspection after test: Inspection after 2～4 hours storage at room temperature ,the sample shall be free from defects:

1. Air bubble in the LCD.
2. Seal leak
3. Non-display.
4. Missing segments.
5. Glass crack.
6. Current I_{DD} is twice higher than initial value.

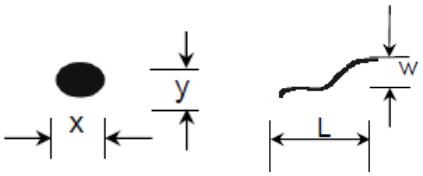
7.2. Inspection plan

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

7.3. 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>A≦0.2</td><td>Acceptable</td></tr><tr><td>0.2 < A ≦ 0.35</td><td>5</td></tr><tr><td>0.35 < 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≦3</td><td>0.03<W≦0.08</td><td>6</td></tr><tr><td>3 < L</td><td>0.03<W≦0.08</td><td>1</td></tr><tr><td>-</td><td>0.08<W</td><td>Follow round type</td></tr></table></td></tr>
<tr><td>Minor</td><td>Dent on the polarizer</td><td>Unit: mm
<table><tr><td>Diameter (mm)</td><td>Acceptable Quantity</td></tr><tr><td>A≦1.5</td><td>Acceptable</td></tr><tr><td>1.5 < A</td><td>0</td></tr></table></td></tr>
<tr><td>Minor</td><td>Bubble</td><td>Unit: mm
<table><tr><td>Diameter (mm)</td><td>Acceptable Quantity</td></tr><tr><td>A≦0.5</td><td>Acceptable</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>A≦0.09</td><td>Acceptable</td></tr><tr><td>0.09 < A≦0.15</td><td>1/pixel, 10 total</td></tr></table></td></tr>
<tr><td>Minor</td><td>Dot width</td><td>Design width ±15%</td></tr>
<tr><td>Minor</td><td>Contrast Irregularity(spot)</td><td>According to the sample</td></tr>
<tr><td>Minor</td><td>Color tone and uniformity</td><td>Obvious uneven color is not permitted</td></tr>
</table>

8. Precautions

8.1. 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.

8.2. 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.

8.3. 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.

9. Using LCD Modules

9.1. Liquid Crystal Display Modules

LCD is composed of glass and polarizer. Pay attention to the following items when handling.

(1) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

(2) Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.).

(3) N-hexane is recommended for cleaning the adhesives used to attach front/rear polarizers and reflectors made of organic substances which will be damaged by chemicals such as acetone, toluene, ethanol and isopropyl alcohol.

(4) When the display surface becomes dusty, wipe gently with absorbent cotton or other soft material like chamois soaked in petroleum benzin. Do not scrub hard to avoid damaging the display surface.

(5) Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading.

(6) Avoid contacting oil and fats.

(7) Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizers. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(8) Do not put or attach anything on the display area to avoid leaving marks on.

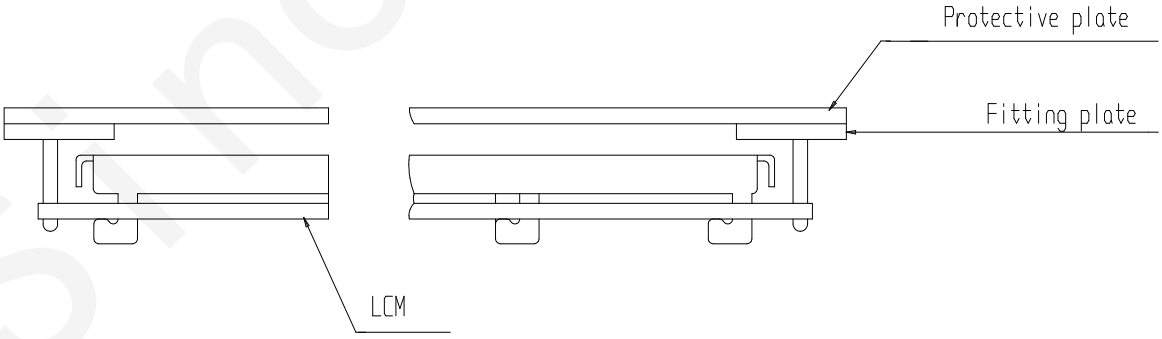
(9) Do not touch the display with bare hands. This will stain the display area and degrade insulation between terminals (some cosmetics are determinate to the polarizers).

(10) As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring.

9.2. Installing LCD Modules

The hole in the printed circuit board is used to fix LCM as shown in the picture below. Attend to the following items when installing the LCM.

(1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be 0.1mm.

9.3. Precaution for Handing LCD Modules

Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

(1) Do not alter, modify or change the shape of the tab on the metal frame.

(2) Do not make extra holes on the printed circuit board, modify its shape or change the positions of components

to be attached.

(3) Do not damage or modify the pattern writing on the printed circuit board.

(4) Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.

(5) Except for soldering the interface, do not make any alterations or modifications with a soldering iron.

(6) Do not drop, bend or twist LCM.

LCM is easy to be damaged. Please note below and be careful for handling.

Correct handling:

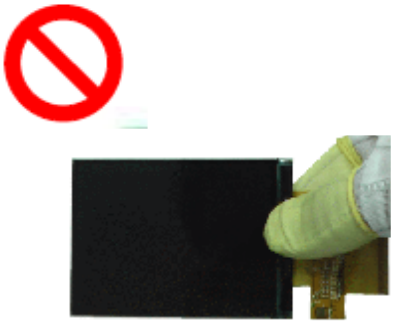
As above picture, please handle with anti-static gloves around LCM edges.

Please don't touch IC directly.

Please don't stack LCM.

Please don’t hold the surface of panel.

Please don’t stretch interface of output, such as FPC cable.



Please don't hold the surface of IC.

Please don't operate with sharp stick such as pens.

9.4. Electro-Static Discharge Control

Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC.

(1) Make certain that you are grounded when handing LCM.

(2) Before remove LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential.

(3) When soldering the terminal of LCM, make certain the AC power source for the soldering iron does not leak.

(4) When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

(5) As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

(6) To reduce the generation of static electricity be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended.

9.5. Precaution for soldering to the LCM

(1) Observe the following when soldering lead wire, connector cable and etc. to the LCM.

- Soldering iron temperature: 280°C±10°C
- Soldering time: 3-4 sec.
- Solder: eutectic solder.

If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

(2) When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

(3) When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

9.6. Precautions for Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (VO). Adjust VO to show the best contrast.

(2) Driving the LCD in the voltage above the limit shortens its life.

(3) Response time is greatly delayed at temperature below the 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.

(4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore, it must be used under the relative condition of 40°C, 50% RH.

(6) When turning the power on, input each signal after the positive/negative voltage becomes stable.

9.7. Storage

When storing LCDs as spares for some years, the following precaution are necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for desiccant.

(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.

(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped.)

(4) Environmental conditions:

- Do not leave them for more than 168hrs. at 60°C.
- Should not be left for more than 48hrs. at -20°C.

9.8. Safety

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

9.9. Return LCM under warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are:

- Broken LCD glass.
- PCB eyelet's damaged or modified.
- PCB conductors damaged.
- Circuit modified in any way, including addition of components.
- PCB tampered with by grinding, engraving or painting varnish.
- soldering to or modifying the bezel in any manner.

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet's, conductors and terminals.

10. Packing Information

10.1. Packing Quantity

TBD.

10.2. Flowing chart

TBD.