中显液晶
技术资料

型号 ZX24064A

2009年3月15日

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RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
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CONTENTS

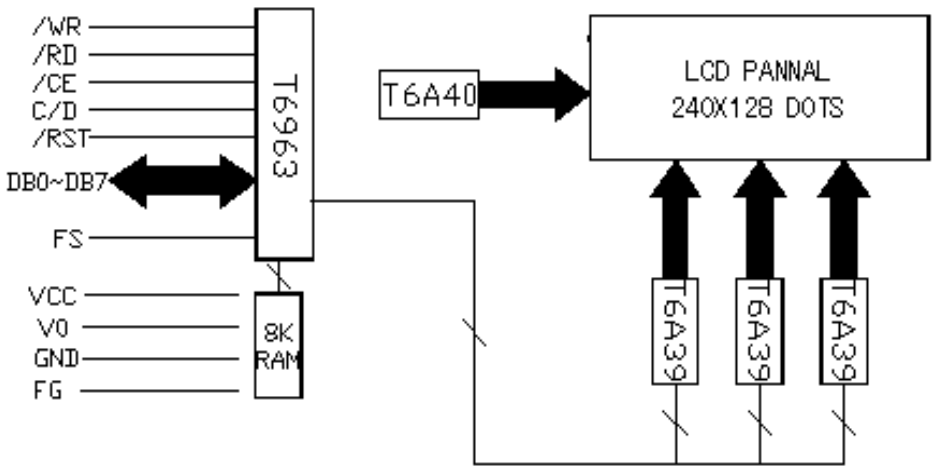
1.FEATURES：

ITEM	STANDARD VALUE	UNIT
Display Type	240X64 dots	-
LCD Type	STN , Yellow-Green， Transflective， positive	-
LCD Duty	1/240	-
Viewing Direction	6:00	
Backlight Type	Bottom Yellow-Green LED OR WHITE SIDE LED	-
Interface	4-BIT OR 8-BIT MPU	-
Driver IC	T6963C	-
LCD Bias	1/9	-

2.MACHANICAL SPECIFICATION

ITEM	SPECIFICATIONS	UNIT
OUTLINE DIMEMSIONS	180.0(L)X65.0(W)X12.0MAX(H)	mm
VIEWING AREA	132.0(L)X39.0(W)	mm
ACTIVE AREA	127.0(L)X33.8(W)	mm
DISP.CONSTRUCTION	240*64 dots	--
DOT SIZE	0.49(L)X0.49(W)	mm
DOT PITCH	0.53(L)X0.53(W)	mm
ASSY.TYPE	COB	--
WEIGHT	TBD	g

3.BLOCK DIAGRAM &APPLICATION CIRCUIT：



4.ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD	Ta=25℃	0	—	7.0	V
POWER SUPPLY FOR LCD DRIVING	VLCD	Ta=25℃	---		+18.0	
INPUT VOLTAGE	VIN	Ta=25℃	-0.3	—	VDD+0.3	V
MODULE OPERATION TEMPERATURE	TOPR	---	-20	—	+70	℃
MODULE STORAGE TEMPERATURE	TSTG	---	- 30	—	+80	℃
Storage Humidity	H_D	Ta < 40 °C	-		90	%RH

5.ELECTRICAL CHARACTERISTICS AND INSTRUCTION CODE

5.1Electrical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage(logic)		VDD-VSS	4.5	5.0	5.5	V	
Supply Voltage(LCD Drive)		VSS-VEE	---	6.0	---	V	
Input Signal Voltage	"H" Level	VIN	VDD-2.2	---	VDD	V	
	"L" Level	VIL	0	---	0.8	V	
Supply current(logic)		IDD	---	24	---	mA	
Supply rrent (LCD Drive)		IEE	---	2.0	---	mA	

5.2Instruction Code

COMMAND	CODE	D1	D2	FUNCTION
REGISTERS	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
SETTING	00100100	Low address	High address	Set Address Pointer
	01000000	Low address	High address	Set Text Home Address
SET CONONTROL	01000001	Columns	00H	Set Text Area
WORD	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area

	1000x000	--	--	OR mode
	1000x001	--	--	EXOR mode
MODE SET	1000x011	--	--	AND mode
	1000x100	--	--	Text Attribute mode
	10000xxx	--	--	Internal CG ROM mode
	10001xxx	--	--	External CG RAM mode
	10010000	--	--	Display off
	1001xx10	--	--	Cursor on, blink off
	1001xx11	--	--	Cursor on, blink on
DISPLAY MODE	100101xx	--	--	Text on, graphic off
	100110xx	--	--	Text off, graphic on
	100111xx	--	--	Text on , graphic on
	10100000	--	--	1-line cursor
	10100001	--	--	2-line cursor
	10100010	--	--	3-line cursor
CURSOR	10100011	--	--	4-line cursor
PATTERN ELECT	10100100	--	--	5-line cursor
	10100101	--	--	6-line cursor
	10100110	--	--	7-line cursor
	10100111	--	--	8-line cursor
DATA AUTO	10110000	--	--	Set Data Auto Write
	10110001	--	--	Set Data Auto Read
READ/WRITE	10110010	--	--	Auto Reset
	11000000	--	--	Data Write and Increment
	11000001	--	--	Data Read and Increment
DATA	11000010	--	--	Data Write and Decrement
READ/WRITE	11000011	--	--	Data Read and Decrement
	11000100	--	--	Data Write and Non variable

	11000101	--	--	Data Read and Non variable
SCREEN PEEK	11100000	--	--	Screen Peek
SCREEN COPY	11101000	--	--	Screen Copy
BIT SET/RESET	11110xxx	--	--	Bit reset
	11111xxx	--	--	Bit set
	1111x000	--	--	Bit0(LSB)
	1111x001	--	--	Bit1
	1111x010	--	--	Bit2
	1111x011	--	--	Bit3
	1111x100	--	--	Bit4
	1111x101	--	--	Bit5
	1111x110	--	--	Bit6
	1111x111	--	--	Bit7(MSB)

6. OPTICAL CHARACTERISTICS

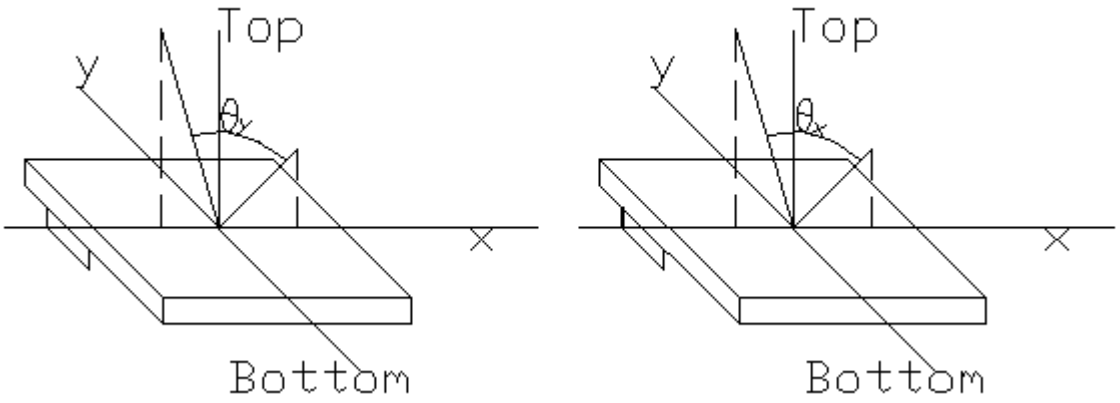
6.1 Optical Characteristics

Ta=25℃

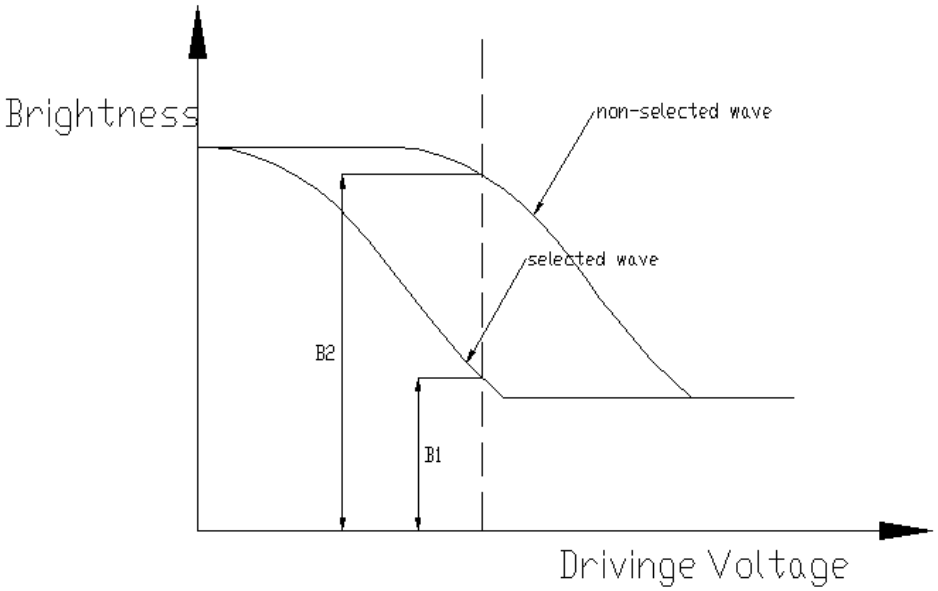
Item		Symbol	Condition		Min.	Typ.	Max.	Unit	Remark
Viewing angle		θ x	Cr	θ y=0	-20 ---- 20			deg	
		θ y	>3	θ x=0	-25 ---- -25				
Contrast Ratio		Cr	θ x=0° θ y=15°		3				
Response Time	Turn on	Ton	θ x=0°				200	ms	
	Turn off	Toff	θ y=0°				360		

6.2 Definition of optical characteristics

6.2.1Definition of viewing Angle(see fig.as follow)



6.2.2Definition of Contrast Ratio(see fig.as follow)

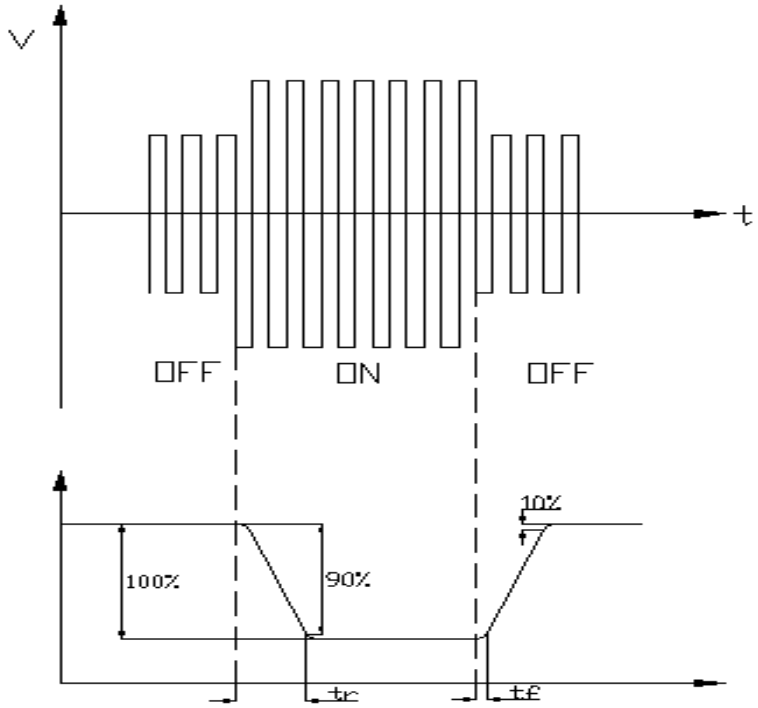


$$\text{Contrast Ratio(K)} = \frac{\text{non-selected state brightness}}{\text{selected state brightness}} = B2/B1$$

Measuring Conditions:

Ambient Temperature: 25℃； 2) Frame freguency : 32Hz

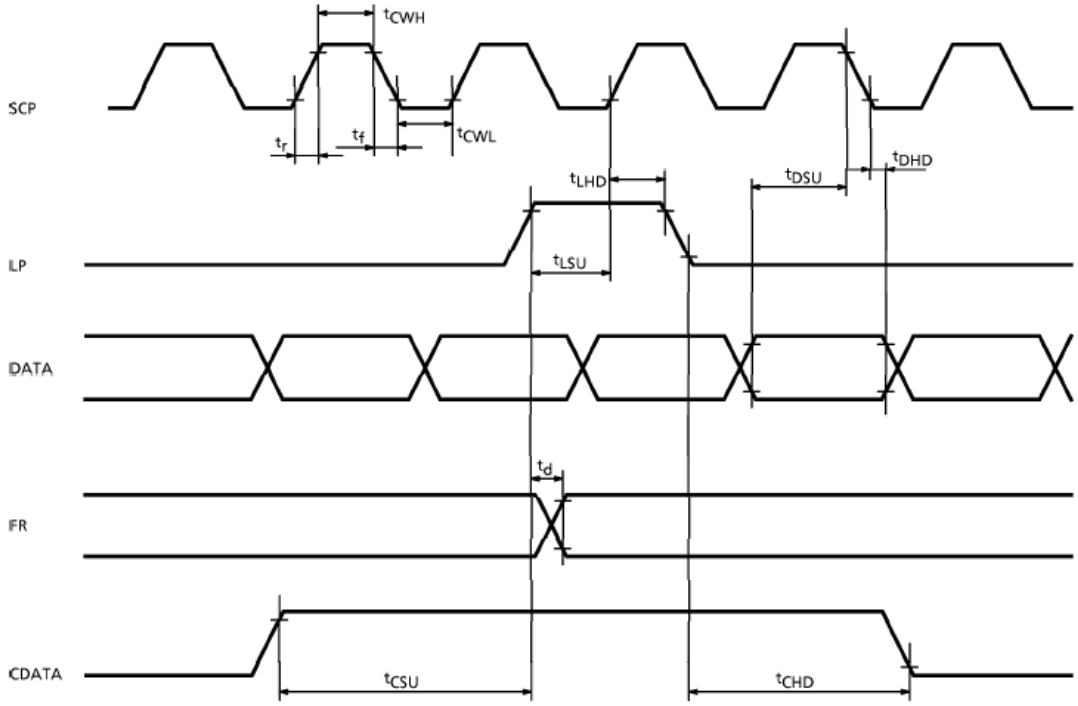
6.2.3Definition of Response time (see fig.as follow)



7.TIMING CHARACTERISTICS

AC CHARACTERISTICS

Switching Characteristics(1)

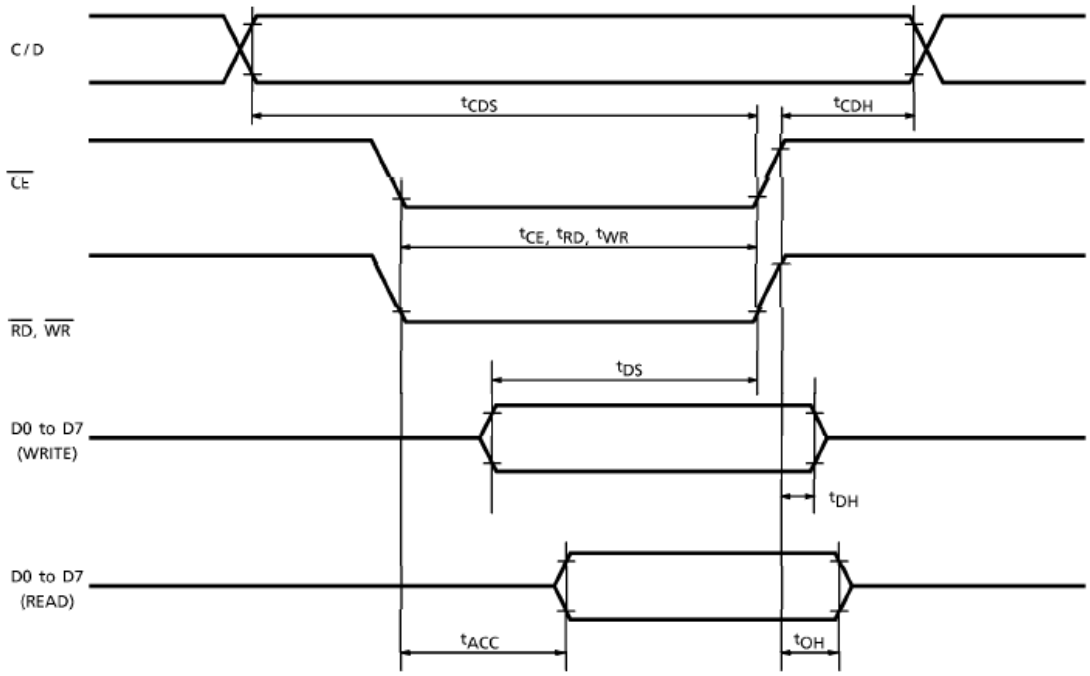


TEST CONDITIONS (Unless otherwise noted, V_{DD} = 5.0V ± 10%, V_{SS} = 0V, Ta = – 20 to 70°C)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Operating Frequency	f_{scp}	Ta = – 10~70°C	—	2.75	MHz
SCP Pulse Width	t_{CWH}, t_{CWL}	—	150	—	ns
SCP Rise / Fall Time	t_r, t_f	—	—	30	ns
LP Set-up Time	t_{LSU}	—	150	290	ns
LP Hold Time	t_{LHD}	—	5	40	ns
Data Set-up Time	t_{DSU}	—	170	—	ns
Data Hold Time	t_{DHD}	—	80	—	ns
FR Delay Time	t_d	—	0	90	ns
CDATA Set-up Time	t_{CSU}	—	450	850	ns
CDATA Hold Time	t_{CHD}	—	450	950	ns

Switching Characteristics(2)

Bus Timing

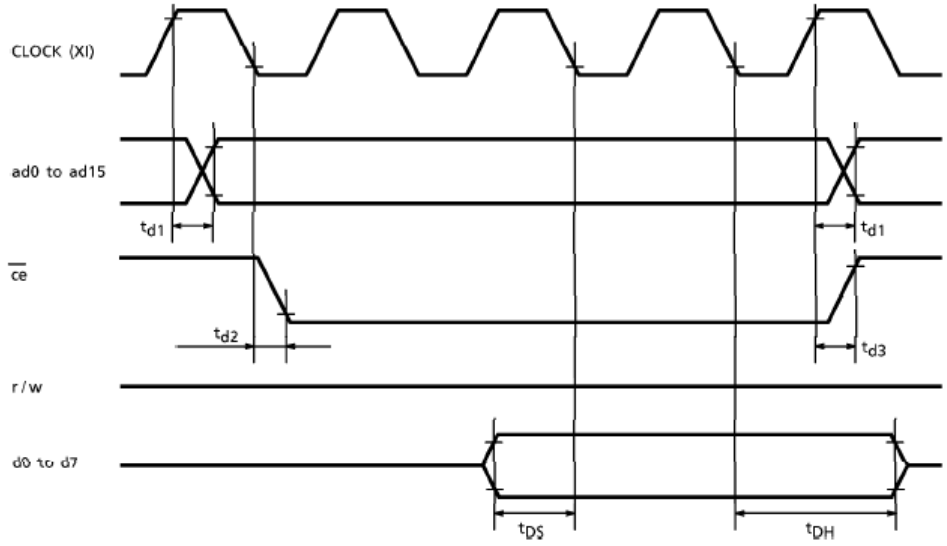


TEST CONDITIONS (Unless otherwise noted, V_{DD} = 5.0V ± 10%, V_{SS} = 0V, Ta = – 20 to 75°C)

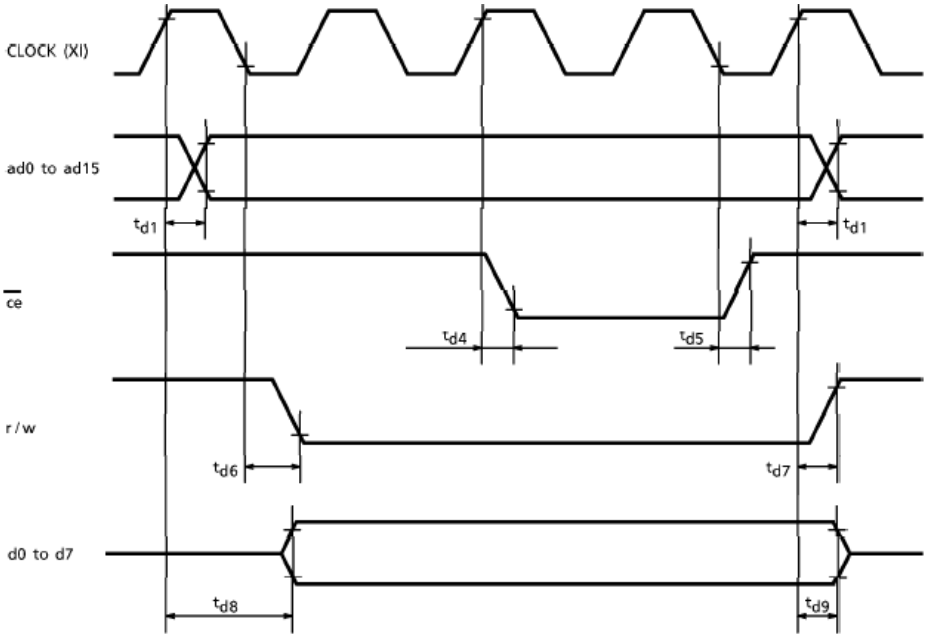
ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
C / D Set-up Time	t_{CDS}	—	100	—	ns
C / D Hold Time	t_{CDH}	—	10	—	ns
CE, RD, WR Pulse Width	t_{CE}, t_{RD}, t_{WR}	—	80	—	ns
Data Set-up Time	t_{DS}	—	80	—	ns
Data Hold Time	t_{DH}	—	40	—	ns
Access Time	t_{ACC}	—	—	150	ns
Output Hold Time	t_{OH}	—	10	50	ns

Switching Characteristics(3)

(1) External RAM Read Mode



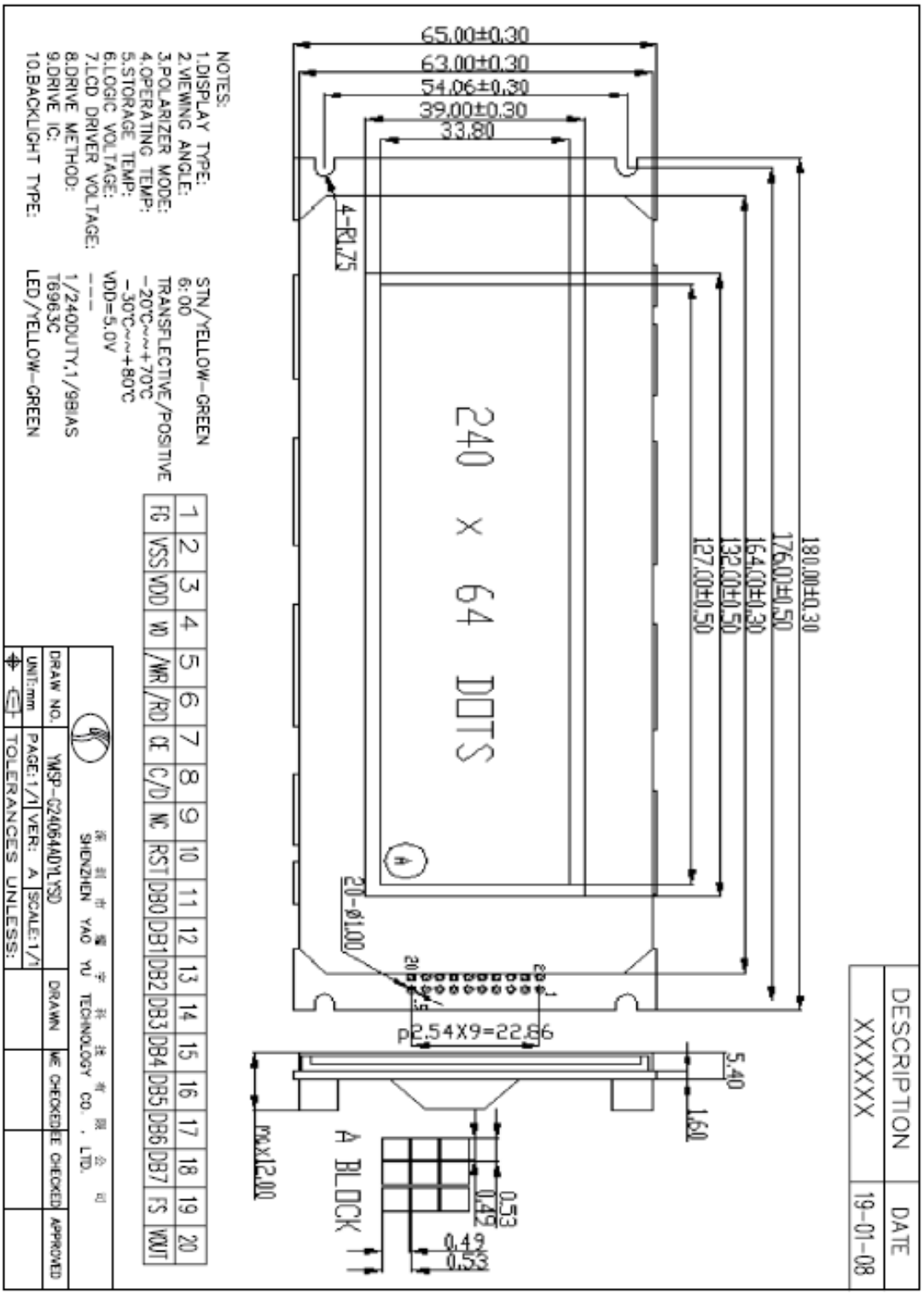
(2) External RAM Write Mode



TEST CONDITIONS (Unless otherwise noted, $V_{DD} = 5.0V \pm 10\%$, $V_{SS} = 0V$, Ta = −20 to 70°C)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Address Delay Time	t_{d1}	—	—	250	ns
ce Fall Delay Time (Read)	t_{d2}	—	—	180	ns
ce Rise Delay Time (Read)	t_{d3}	—	—	180	ns
Data Set-up Time	t_{DS}	—	0	—	ns
Data Hold Time	t_{DH}	—	30	—	ns
ce Fall Delay Time (Write)	t_{d4}	—	—	200	ns
ce Rise Delay Time (Write)	t_{d5}	—	—	200	ns
r/w Fall Delay Time	t_{d6}	—	—	180	ns
r/w Rise Delay Time	t_{d7}	—	—	180	ns
Data Stable Time	t_{d8}	—	—	450	ns
Data Hold Time	t_{d9}	—	—	200	ns

8. OUTLINE DIMENSIONS



9. PIN ASSIGNMENT

Pin NO.	Symbol	Description(Function)	Remark
1	FG	Module Frame Ground	
2	VSS	Ground	
3	VDD	Supply voltage for logic and LCD(+)	
4	V0	Operating voltage for LCD	variable
5	/WR	Data Write into T6963C	
6	/RD	Data Read F from T6963C	
7	/CE	Chip enable Signal	
8	C/D	Command/Data Selection	
9	NC	No connection	
10	Reset	Reset signal	
11	DB0	Data bit 0	
12	DB1	Data bit 1	
13	DB2	Data bit 2	
14	DB3	Data bit 3	
15	DB4	Data bit 4	
16	DB5	Data bit 5	
17	DB6	Data bit 6	
18	DB7	Data bit 7	
19	FS	Font Selection	
20	Vout	DC-DC Output Voltage	

10. RELIABLITY

10.1 Content of Reliablity Test

NO.	Test Item	Content of Test	Test condition
1	High Temperature Storage	Endurance test applying the high storage temperature for a long time	60℃ 96H
2	Low Temperature Storage	Endurance test applying the low storage temperature for a long time	50℃ 96H
3	High Temperature Operation	Endurance test applying the Temperature electric stress (voltage &current) and the thermal stress to the element for a long time	50℃ 96H
4	High Temperature Operation	Endurance test applying the Temperature electric stress (voltage &current) and the thermal stress to the element for a long time	0℃ 96H
5	High Temperature /Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time	40℃ 90%RH 96H

6	Temperature Cycle	Endurance test applying the low and high temperature cycle 10 cycle -20℃--25℃--60℃--25℃ 30min 5min 30min 5min 1cycle	-20℃/60℃
7	Vibration Test (package state)	Endurance test applying the vibration during transportation	10Hz~55Hz ~10Hz 1.5mmP-P,1.5g X.Y.-5mm
8	Shock Test (package state)	Endurance test applying the shock during transportation	Drop a product form a height of 79cm to a solid unbending and horizontal plane
9	Atmospheric Pressure Test	Endurance test applying the atmospheric prssure during transportation by air	40kPa 24H

10.2 Failure Judgment Criterion

Criterion Item	Test Item NO.									Failure Judgement Criterion
	1	2	3	4	5	6	7	8	9	
Basic Specification	0	0	0	0	0	0	0	0	0	Out of the basic Specification
Electrical Specification	0	0	0	0	0					Out of the electrical specification
Mechanical Specification						0	0	0		Out of the mechanical specification
Optical Characteristic	0	0	0	0	0	0				Out of the optical specification
Remark	Basic specification = Display specification + Mechanical specification									

11. PRECAUTIONS FOR USING LCD MODULES

Handing Precautions

(1) The display panel is made of glass. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

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

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

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents :

- Isopropyl alcohol

- Ethyl alcohol

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water

- Ketone

- Aromatic solvents

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

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

- Be sure to ground the body when handling the LCD modules.

- Tools required for assembling, such as soldering irons, must be properly grounded.

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

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

Storage Precautions

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags (avoid high temperature high humidity and low temperatures below 0 C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.

- Terminal electrode sections.

12. USING LCD MODULES

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 isopropylalcohol.

(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 temp erature air.

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

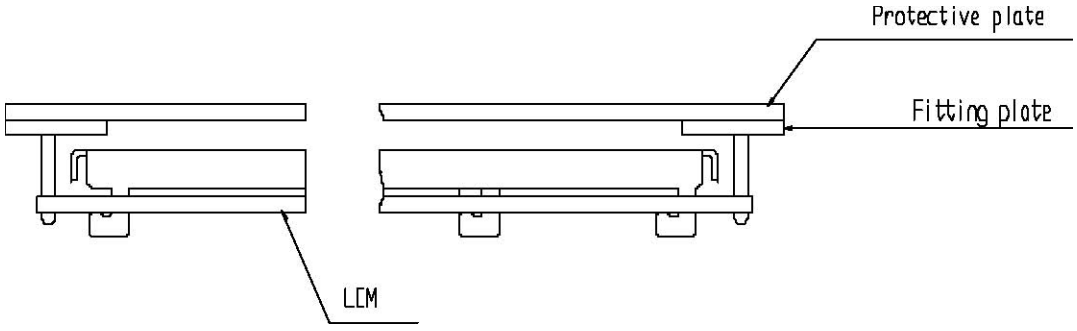
(9) Do not touch the display with bare hands. This will stain the display area and degradate insulation between terminals (some cosmetics are determinated to the polarizers).

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

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.

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 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.

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.

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 dur 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 electoluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

Precautions for Operation

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

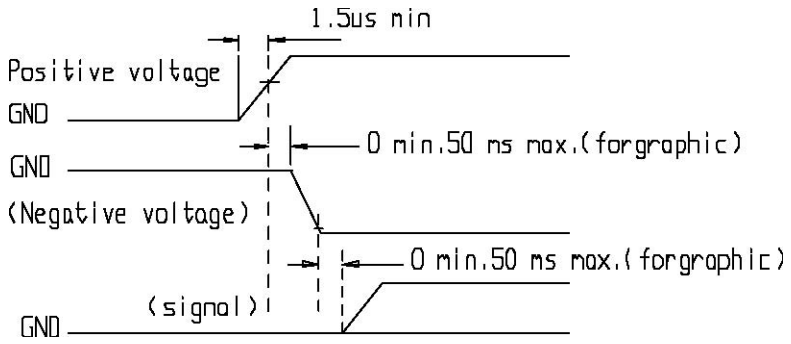
(2) Driving the LCD in the voltage above the limit shortens its life.

(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.



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 dessicant.

(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.)

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 leakes out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

Return LCM under warranty

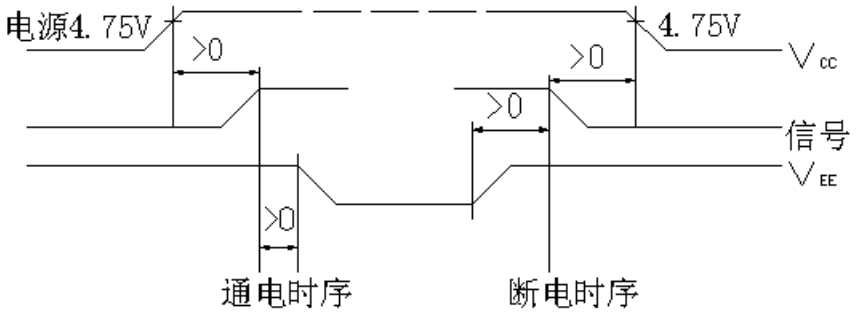
No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

- 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.

液晶显示模块使用注意事项

1. 请勿随意自行加工、整修、拆卸。
2. 避免对液晶屏表面施加压力。
3. 不要用手随意去摸外引线、电路板上的电路及金属框。
4. 如必须直接接触时，应使人体与模块保持同一电位，或将人体良好接地。
5. 焊接使用的烙铁、操作用的电动改锥等工具必须良好接地，没漏电。
6. 严防各种静电。
7. 模块使用接入电源及断开电源时，必须按图时序进行。即必须在正电源（ 5 ±0.25V）稳定接入后,才能输入信号电平。如在电源稳定接入前，或断开后就输入信号电平，将会损坏模块中的集成电路，使模块损坏。



8. 点阵模块在调节时，应调整 VEE 至最佳对比度、视角时为止。如果 VEE 调整过高,不仅会影响显示，还会缩短液晶的寿命。
9. 模块表面结雾时，不要通电工作，因为这将引起电极化学反应，产生断线。
10. 模块要存储在暗处（避阳光），温度在-10℃～+35℃，湿度在 RH60%以上的地方。如能装入聚乙烯口袋（最好有防静电涂层）并将口封住最好。

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