SPECIFICATION

3-Segment "8" Type LCD Module

SDK8A4302A

APPOVED SIGNATURES

SANTECH	Customer

SANTECH DISPLAY CO.,LTD

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1 . REVISION RECORD

REV	DATA	PAGES	DESCRIPTION
V1.0	26/6-2007		New ver

2.GENERAL SPECIFICATION:

Interface with   MPU with 8 bit

Display Specification:

Display content: 3 segments "8"+8 logos

Display type: FSLCD

Display mode: position

Polarizer type: Transmissive

Viewing angle: 6 O'clock

Driving method: Static

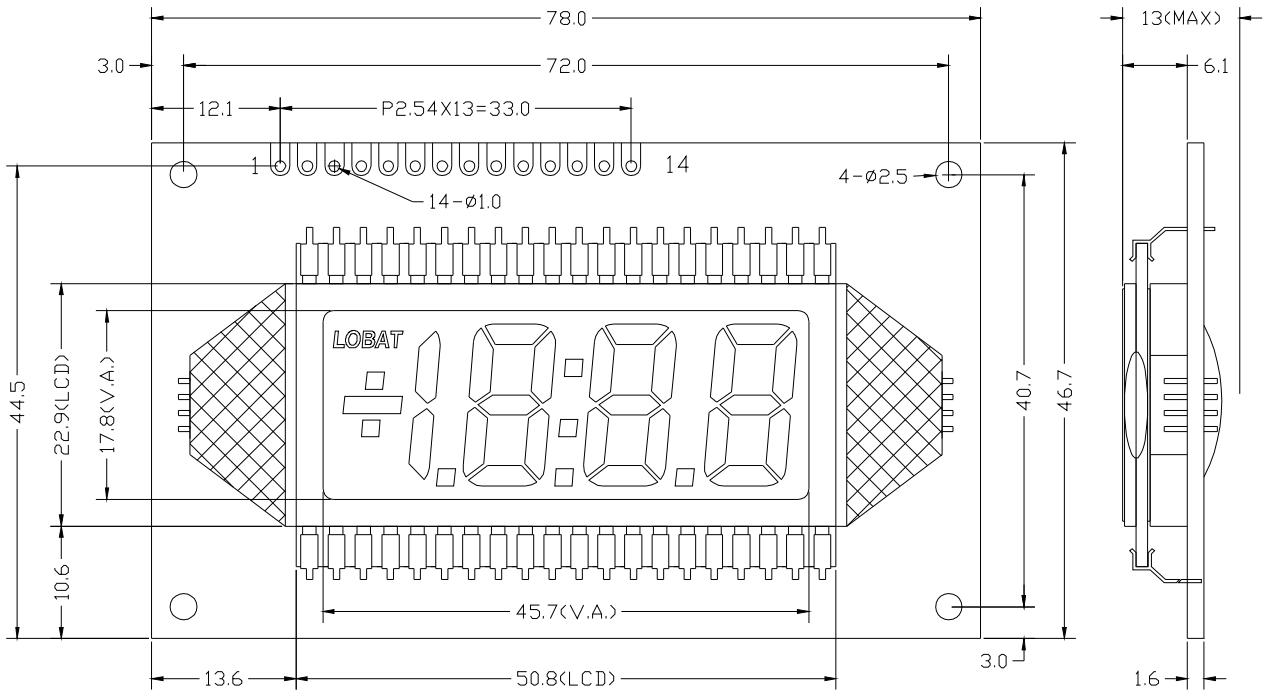### Mechanical characteristics (Unit: mm):

External dimension: 78.0X46.7
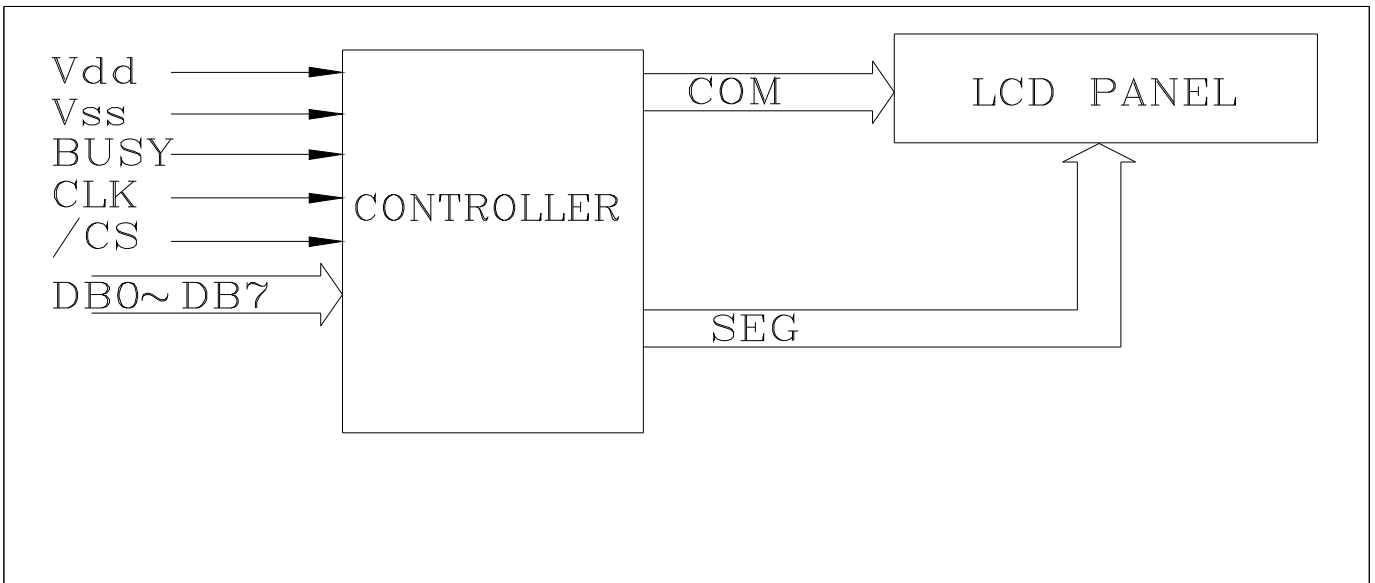
View area : 45.7X17.8

Weight： g

 POWER ： +5V

3.OUTLINE DEMENSION:


4.BLOCK DIAGRAM:

5.ABSOLUTE MAXIMUM RATINGS:

ITEM	SYMBOL	CONDITION	STANDARD VALUE		UNIT
			MIN	MAX	
Supply Voltage for Logic	Vdd		-0.3	5.5	V
Supply Voltage for LCD	Vee	Ta=25℃	0	-10.0	V
Input Voltage	Vi		-0.3	Vdd +0.3	V
Operating Temperature	Top	-	0	50	℃
Storage Temperature	Tstg	-	-20	60	℃

6. ELECTRICAL SPECIFICATIONS

Item	Symbol	Condition	Standard Value			Unit
			Min	Type	Max	
Supply Voltage for logic	Vdd-GND	-	4.75	5.0	5.25	V
Supply Current for logic	Idd	Vdd=5V	-	45	-	mA
Driving Current for LCD	Iee		-	0.6	-	mA
Driving Voltage for LCD	Vdd-Vee		-	7.5	-	V
Input Voltage H level	Vih		2.4	-	Vdd	V
Input Voltage L level	Vil		0	-	0.6	V

7.PIN ASSIGNMENT:

Pin NO.	Symbol	Function		Remark
1	Vss	Power Supply	0V	
2	Vdd		+5V	
3	NC	No Connect		
4	BUSY	Busy Signal(output)		
5	/CS	Chip select(input)		
6	CLK	Write clock(input)		
7~14	DB0~DB7	Data Bus(input)		

8.DISPLAY RAM MAPING:
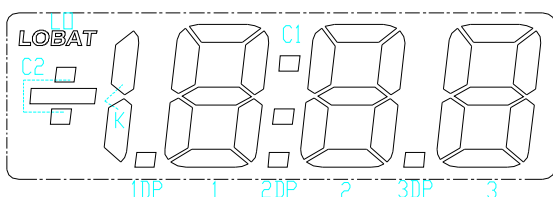
(1) Structure of Data:

Address	0~14	15
Content	Display Data	affirm word (0xfa)

(2) Display Data:

DATA / COLOUR	0~14	
	Logo1	Logo2
White	7XH	X7H
Yellow	5XH	X5H
Magenta	6XH	X6H
Red	4XH	X4H
Cyan	3XH	X3H
Green	1XH	X1H
Blue	2XH	X2H
Black	0XH	X0H

Address	0	1	2	3	4	5	6	7	8	9	10	11
Display Logo	ND, K	-, C2	LO, C1	3C, 3D	3E, 3B	3A, 3F	3G, P3	2C, 2D	2E, 2B	2A, 2F	2G, P2	1C, 1D
Address	12	13	14									
Display Logo	1E, 1B	1A, 1F	1G, P1									

Display Example:

K: display yellow; 1G: display blue; P1:display red;

Address	Content	DATA								HEX
		HIGH 4 BITS				LOW 4 BITS				
		BIT 7	6	5	4	3	2	1	0	
0	ND,K	X	X	X	X	0	1	0	1	X5H
-	-	-	-	-	-	-	-	-	-	-
14	1G,P1	0	0	1	0	0	1	0	0	24H

9. AC CHARACTERISTICS(Vdd=5.0V)

Symbol	parameter	Conditions	Min.	Typ.	Max.	Unit
Tclk	CLK input pulse width		10	32	60	us
Tcl₁	Hold time for /CS to CLK clock width	-	-	4	-	us
Tch1	Hold time for /CS to CLK clock width	-	-	14.8	-	us

10.COMMAND SUMMARY:

 When Busy signal is High ,Cannot write Data;

  When Busy signal is Low ,Can write Data;

11.TIMING DIAGRAMS :
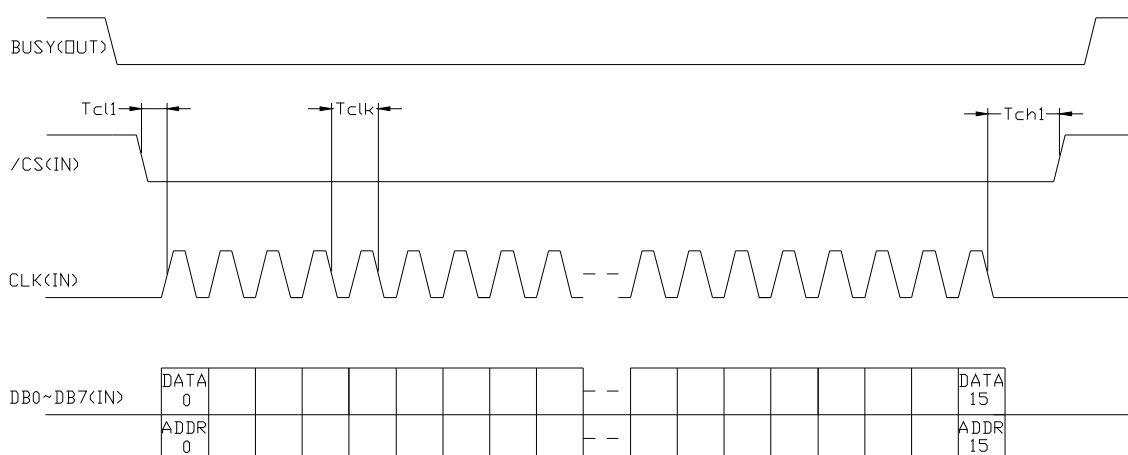
12.OPTICAL CHARACTERISTICS:

| ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REF.
Contrast	CR	25℃，Vdd=5V，θ=0, Ø=0	--	12	--		(2)
Rise Time	Tr	25℃，Vdd=5V，θ=0, Ø=0	--	160	240	ms	(3)
Fall Time	Tf	25℃，Vdd=5V，θ=0, Ø=0	--	100	150	ms	(3)
Viewing Angle	θ1- θ2	25℃	--	--	60	DEG	(1)
	Ø1, Ø2		-40	--	40		

(1)Definition of viewing Angle:
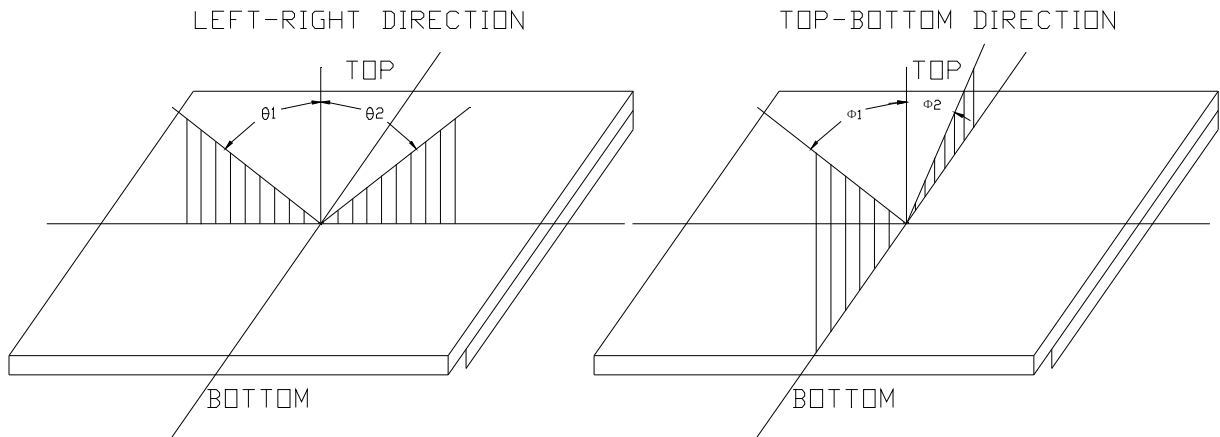
(2)Definition of Contrast Ratio:

$$\text{Contrast Ratio} = \frac{\text{Brightness of non-selected condition}}{\text{Brightness of selected condition}}$$
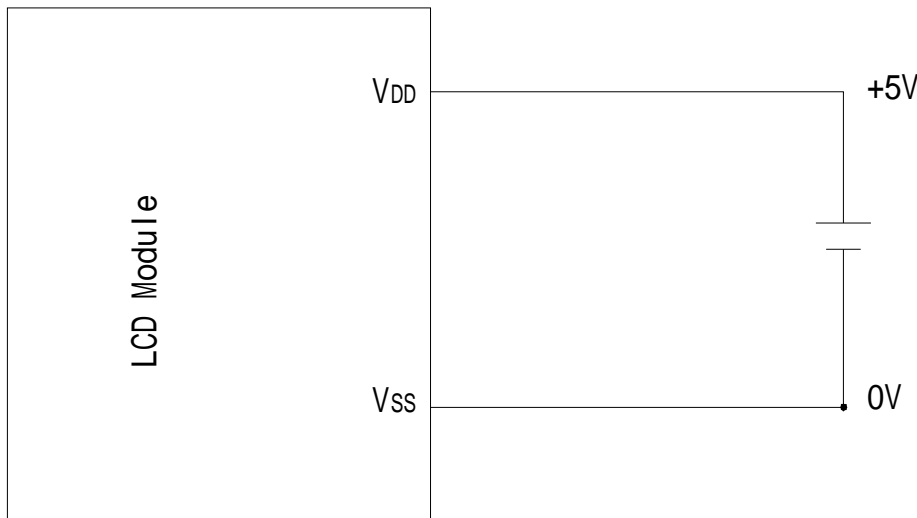
Test condition: standard A light source

(3)Response Time:

Response time is measured as the shortest period of possible between the change in

state of an LCD segments as demonstrated below:
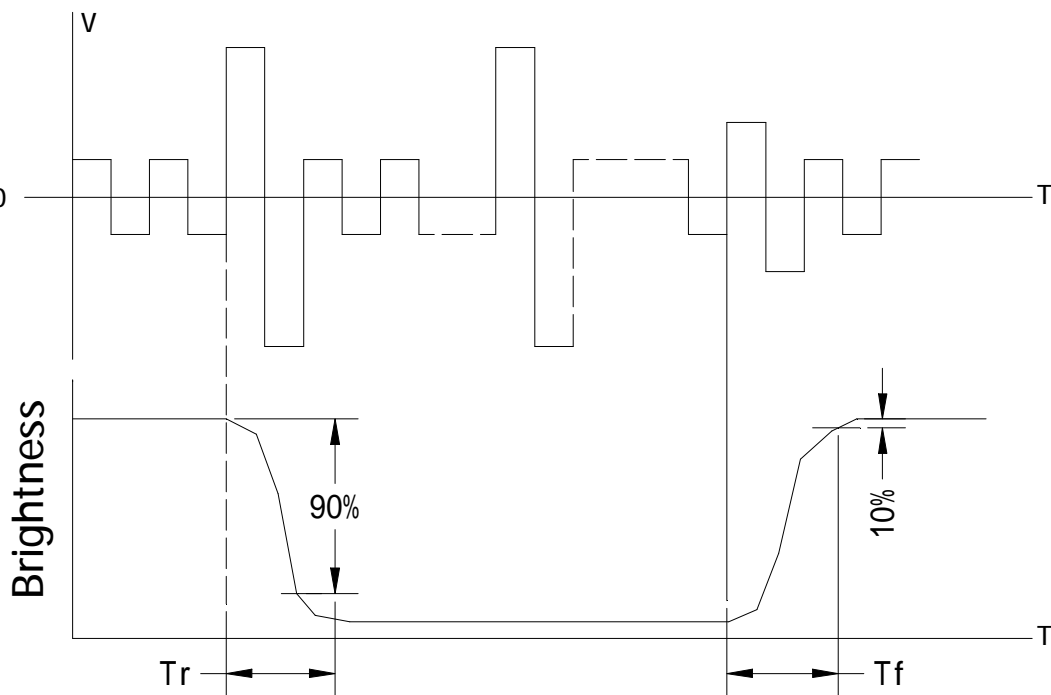
13.POWER SUPPLY SCHEMATICS

For Single Source

14. PRECAUTION FOR USING LCM

1. LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead. To clean dust off the display surface. Wipe gently with cotton. Chamois or other soft material soaked in petroleum benzine.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handing. especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2. Liquid Crystal Display Modules
2.1 Mechanical Considerations
LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the tabs on the metal frame.

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattem.

(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any tress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pie ls.

2.2. Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.

(2). The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3). Only properly grounded soldering irons should be used.

(4). If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5). The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6). Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

2.3. Soldering

(1). Solder only to the I/O terminals.

(2). Use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature: 280 ℃±10℃

(4). Soldering time: 3 to 4 sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4. Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) nay cause the segments to appear "fractured".

2.5. Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6. Limited Warranty

Unless otherwise agreed between SANTECH and customer, SANTECH will repair or repair any of its LCD and LCM, which is found to be defective electrically and visually when inspected in accordance with SANTECH acceptance standards, for a period on one year from data of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of SANTECH is limited to repair and/or replacement on the terms set forth above. SANTECH will not responsible for any subsequent or consequential events.