SPECIFICATIONS

SAMPLE CODE：SGN-G12832H-1DPFNWN
REVISION.：1.00
Customer Approved
DATE:

RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
Mar,06.2006	1.00	FIRST ISSUE	黃成昌		

CONTENTS

1. GENERAL SPECIFICATIONS：

1-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by Signal HK Limited to Customer.

1-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

1-3 MODULE NAME:

SGN-G12832H-1DPFNWN

2. FEATURES：

2-1 MAIN LCD (LARGE)

Item	Standard Value
Display Type	128 *32 dots
LCD Type	☐FSTN, BLUE,Transmissive,Negative,Extened TEMP ■FSTN, Transflective,Positive,Extened TEMP ☐STN, BLUE,Transmissive,Negative,Extened TEMP ☐STN, GREY,Transflective,Positive,Extened TEMP ☐STN, Yellow-GREEN,Positive,Normal TEMP
Drive Pattern	1/33Duty, 1/6Bias
Viewing Direction	6 O'clock
Backlight Type	☐YELLOW-GREEN LED BOTTOM BL ☐BLUE EDGE LED BL ☐CCFL WHITE BL
Weight	TBD
Interface	8-bit 6800/Serial MPU interface
Driver IC	ST7565S

3. MACHANICAL SPECIFICATIONS：

ITEM	STANDARD VALUE	UNIT
DISPLAY FORMAT	128X 32 DOTS	
MODULE DIMENSION	34.5(W) X 42.5(H) X 1.7(T)MAX	mm
EFFECTTVE DISPLAY AREA	32.0(W) X10.0(H)	mm
DOT SIZE	0.19(W) X 0.21(H)	mm
DOT PITCH	0.21(W) X 0.24 (H)	mm
LCD TYPE	FSTN	
DUTY AND BIAS	1/33DUTY; 1/6 BIAS	
VIEWING DIRECTION	6:00	
BACK LIGHT		

4. ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VSS	Ta=25℃	-5.5	—	-2.0	V
INPUT VOLTAGE	VIN	Ta=25℃	-0.3toVdd	—	+0.3	V
Module OPERATION TEMPERATURE	TOPR	---	-10	—	+60	℃
Module STORAGE TEMPERATURE	TSTG	---	-20	—	+70	℃
Storage Humidity	H_D	Ta < 40 °C	-		90	%RH

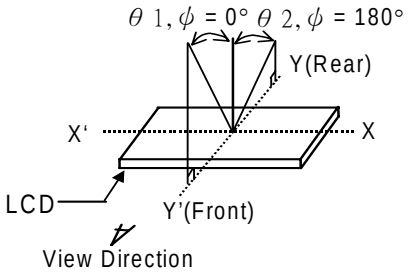
5. ELECTRICAL CHARACTERISTICS

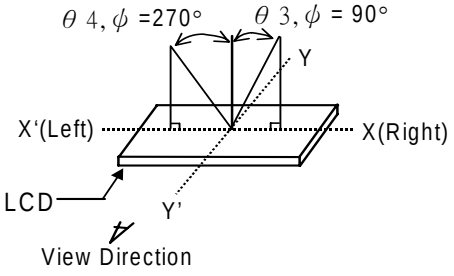
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage (logic)	Vdd-Vss	-	1.8	-	3.3	V
Supply Voltage (LCD)	Vlcd	Vdd=3.3(25°C)	4.0	-	13	V
Input signal voltage	V-ih	“H” level	-0.3toVdd	-	0.3	V
	V-il	“L” level	-	-	-	V
Output signal voltage	V-oh	“H” level	-0.3toVdd	-	0.3	V
	V-ol	“L” level	-	-	-	V
Supply Current (logic)	Icc	-	0.07	-	0.1	mA
Supply Current (LCD)	Io	-	-	-	-	mA
Supply Voltage (LED)	V-bl	See note 1				V
Supply Current (LED)	I-bl	See note 1		-		mA

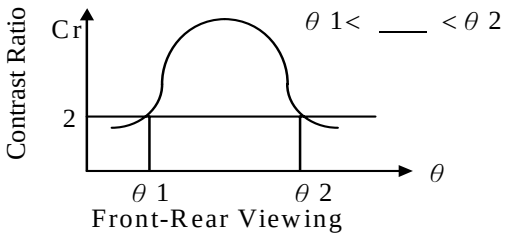
Note 1: We have set some resisters between the backlight and the backlight power supply “A”.

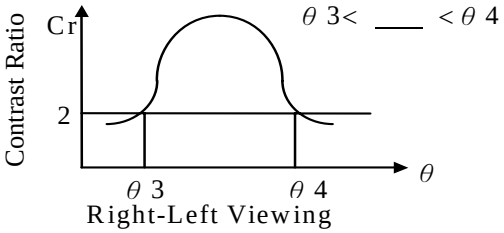
6.OPTICAL CHARACTERISTICS

(1) DEFINITION OF VIEWING ANGLE



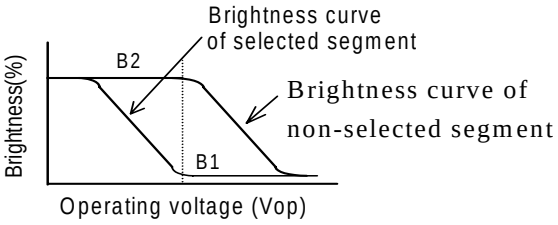




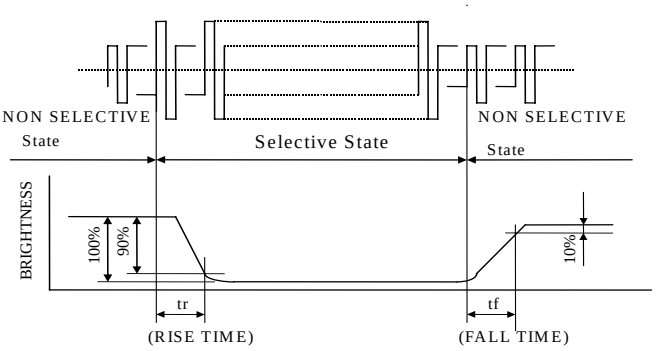


(2) DEFINITION OF CONTRAST

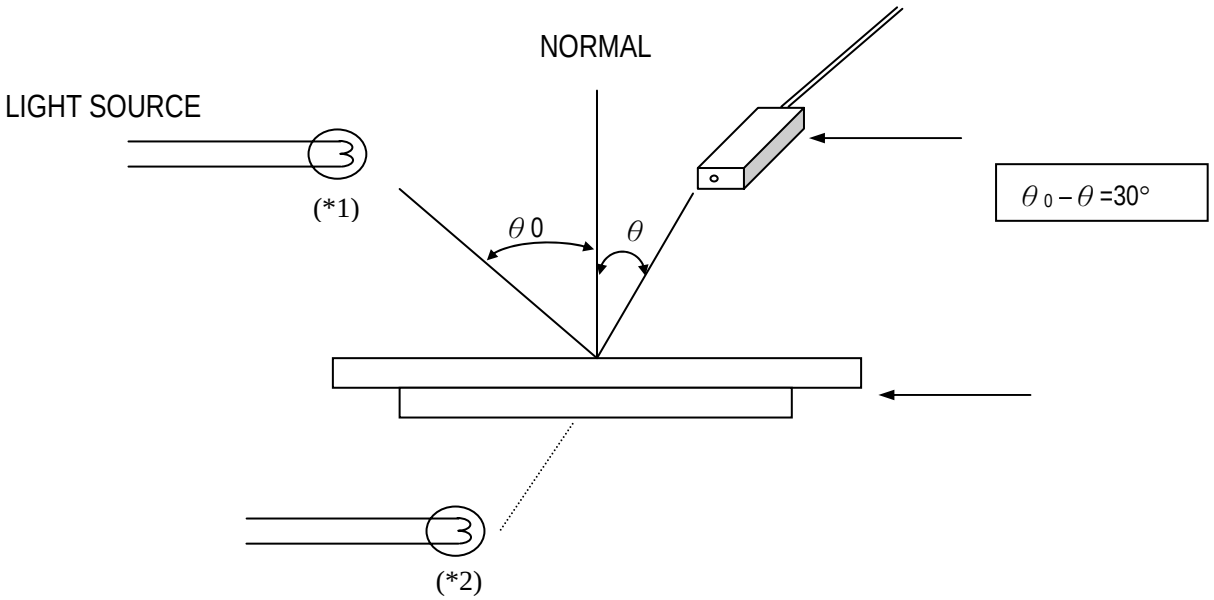
$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



(3) DEFINITION OF RESPONSE

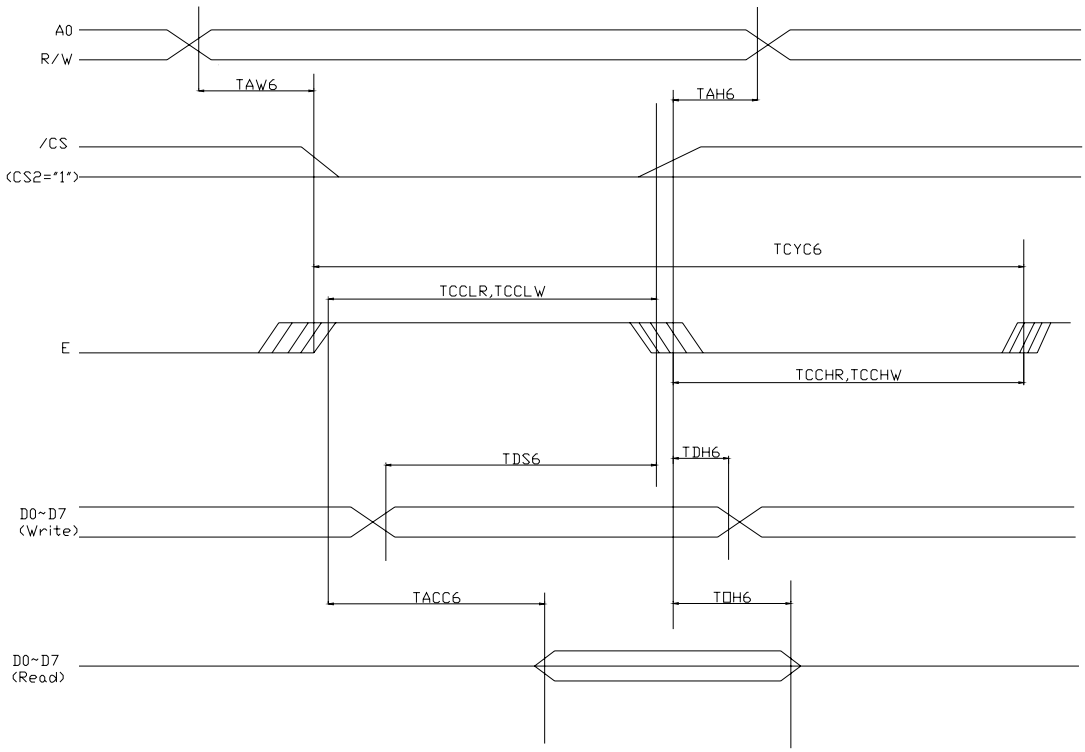


(4) Measuring Instruments For Electro-optical Characteristics



7.0 .TIMING CHARACTERISTICS

System Bus Read/Write characteris (For the 6800 Series MPU)



(VDD=3.3V,Ta=25℃)

ITEM	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH6}		0	-	ns
Address setup time		t_{AW6}		0	-	
System cycle time		t_{CYC6}		240	-	
Enable L pulse width (WRITE)	WR	t_{EWLW}		80	-	
Enable H pulse width (WRITE)		t_{EWHR}		80	-	
Enable L pulse width(READ)	RD	t_{EWLR}		80	-	
Enable H pulse width(READ)		t_{EWHR}		140	-	
WRITE Data setup time	D0 to D7	t_{DS6}		40	-	
WRITE Address hold time		t_{DH6}		0	-	
READ access time		t_{ACC6}	C_L=100pF	-	70	
READ Outupt disable time		t_{OH6}	C_L=100pF	5	50	

The Serial Interface

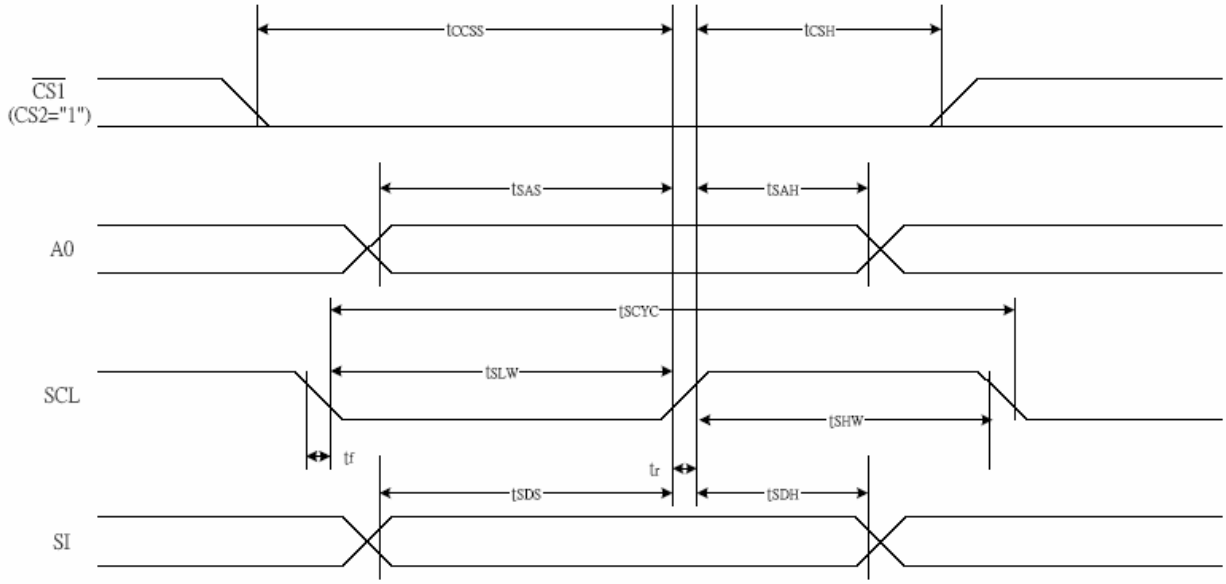


Figure 39

Table 30

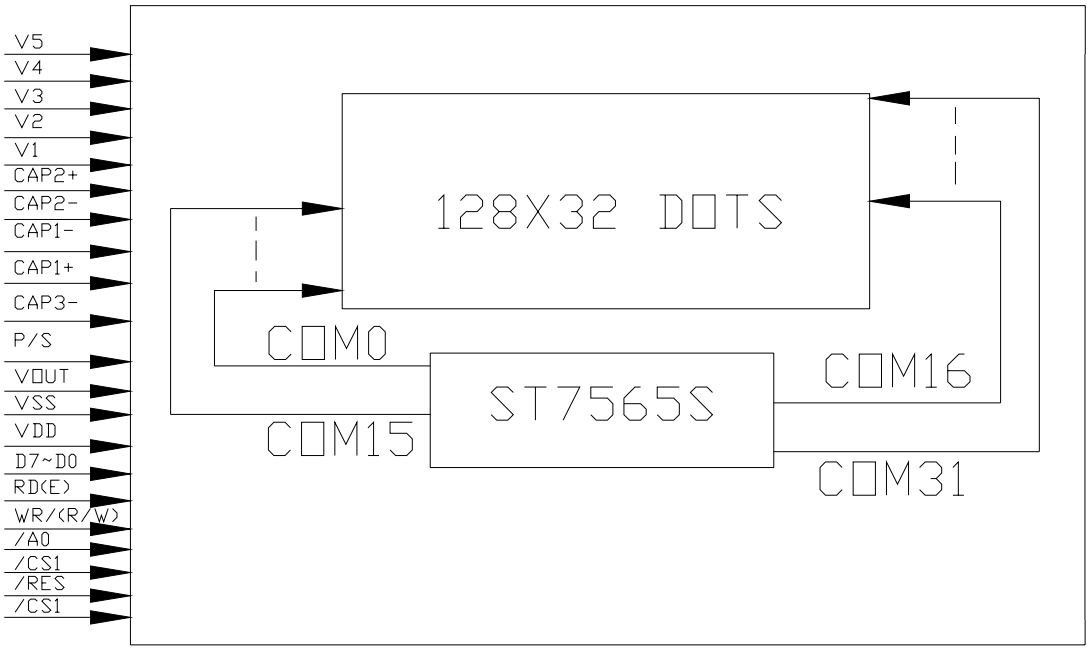
(V_{DD} = 3.3V, Ta =25°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Serial Clock Period	SCL	T_{scyc}		50	—	ns
SCL "H" pulse width		T_{shw}		25	—	
SCL "L" pulse width		T_{SLW}		25	—	
Address setup time	A0	T_{SAS}		20	—	
Address hold time		T_{sah}		10	—	
Data setup time	SI	T_{sds}		20	—	
Data hold time		T_{SDH}		10	—	
CS-SCL time	CS	T_{css}		20	—	
CS-SCL time		T_{csh}		40	—	

8. PIN ASSIGNMENT

PIN	SYMBOL	FUNCTION
1	VDD	Logic Voltage supply +3.3v
2	P/S	This is the MPU interface switch terminal. P/S="H":Parallel data input; P/S="L":Serial data input
3	VSS	Power Groud
4~8	V5~V1	These are the LCD driving voltage levels. All theseLevels are referenced to VDD
9	CAP2+	DC/DC voltage converter.A capapcitor is connected between this terminal and the CAP2- terminal.
10	CAP2-	DC/DC voltage converter.A capapcitor is connected between this terminal and the CAP2+ terminal.
11	CAP1-	DC/DC voltage converter.A capapcitor is connected between this terminal and the CAP1+ terminal.
12	CAP1+	DC/DC voltage converter.A capapcitor is connected between this terminal and the CAP1- terminal.
13	CAP3-	DC/DC voltage converter.A capapcitor is connected between this terminal and the C1+ terminal.
14	VOUT	DC/DC voltage converter.A capapcitor is connected between this terminal and VSS.
15	VSS	Power Groud
16~23	D7~D0	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus. When the serial interface is selected(p/s="L"): D7:serial data input(SI);D6:the serial clock input(SCL). D0 to D5 are set to high impedance.
24	RD(E)	ST7565S series data bus is in an output status when this signal is "L". When connected to a 6800 Series MPU,this is active HIGH. This is the 6800 Series MPU enable clock input terminal.
25	WR(R/W)	When is the read/write control signal input terminal. Wher R/W="H":Read; Wher R/W="L":Write
26	A0	A0="H":Indicates D7~D0 is display data. A0="L": Indicates D7~D0 is control data.
27	/RET	When /RES is set to "L",the settings are initialized
28	/CS1	This is the chip select signal.

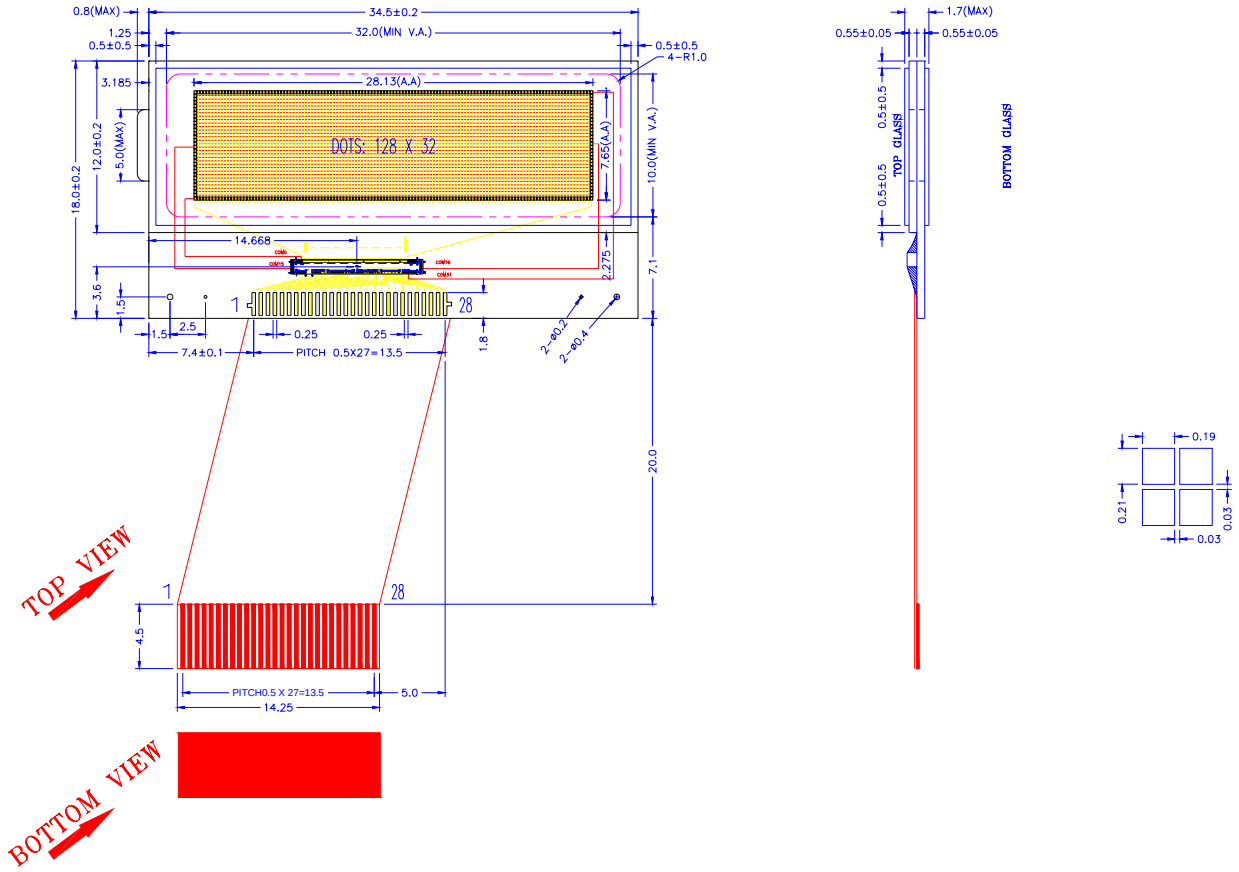
9. BLOCK DIAGRAM



Display Control Instruction:

Please refer to the series of ST7565S.

10.OUTLINE DIMENSIONS



11. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
OPERATING TEMPERATURE	TOPR	-20℃～+70℃	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
STORAGE TEMPERATURE	TSTG	-30℃～+80℃	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
HUMIDITY	—	See Note	WITHOUT CONDENSATION

12.RELIABITY

12-1 RELIABILITY TEST

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERTURE +70℃ 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE -20℃ 240HRS	
STORAGE TEMPERATURE	HIGH TEMPERTURE +80℃ 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE - 30℃ 240HRS	
HUMIDITY	40℃ 90%RH 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	• Operating Time: thirty minutes exposure for each direction (X,Y,Z) • Sweep Frequency: 10～55Hz (1 min) • Amplitude: 1.5mm	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	-20℃(30mins) ←→+70℃(30mins) 10 cycles	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

*NOTE: TEST CONDITION

(1)TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP. SET AT 25±2℃, HUMIDITY SET AT 60±5%RH

(2) OPERATING STATE: SAMPLES SUBJECT TO THE TESTS SHALL BE IN " OPERATING" CONDITION

13. Precaution for Use

The following precautions should be followed, since this module contains precise parts.

(1) Do not store module for an extended periods of time under the conditions of high temperature and high humidity.

(2) Avoid using or storing the module in areas that expose it to direct sunlight or ultraviolet rays.

(3) Use protective finger covers when handling the module to avoid scratching or staining the module.

(4) Care should be taken not to expose the module to static electricity, because the module contains C-MOS LSI's.

(5) The LSI is sensitive to light.
The user's product should be designed so that LSI is not exposed to any light during operation.

(6) During installation, cover the display area with acrylic protection plates to protect the polarizer plate and LCD cells.

(7) Do not apply any excessive shocks to the module because the module contains sensitive LCD cells.
Do not use a module, which has experienced strong mechanical shock.

(8) Care should be taken when the power supply turns on as following.
(a) Do not apply any input signals before the supplying voltage is applied.
(b)Do not turn off the power supply while any input signals are applied.

Caution

(1) Dangerous. Do not shock glass because glass can break.

(2) If module breaks, do not touch it directly.
(Glass could stick or cut skin.)

(3) Do not swallow Liquid Crystal.
(In case of broken LCD panel, do not swallow liquid crystal even if there is no proof that liquid crystal is poisonous.)

(4) If liquid crystal is exposed to skin, wash the area thoroughly with alcohol or soap.

(5) When disposing of the product, please observe industrial waste disposal laws in each country and district.

(6) In case of injury, give immediate treatment and consult with a doctor.

(7) This product is constructed precisely. Don't disassemble or modify.

※ Neglecting this mark can cause injury to humans and damage to materials