

# SPECIFICATION



## YM12864YDBSWWD

December 7, 2007  
Version 1.01



## RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
October 19 2005	1.00	FIRST ISSUE	JOHE HE		
December 7, 2007	1.01	Amend address and other things	ynn		



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## 1. GENERAL SPECIFICATIONS :

### 1-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by YAoyu TECHNOLOGY to Customer .

### 1-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

### 1-3 MODULE NAME:

**YM12864YDBSWWD**

## 2. FEATURES :

### 2-1 MAIN LCD (LARGE)

Item	Standard Value
Display Type	128 *64 dots
LCD Type	<input type="checkbox"/> FSTN, BLUE,Transmissive,Negative,Extened TEMP <input type="checkbox"/> FSTN, Transflective,Positive,Extened TEMP <input checked="" type="checkbox"/> STN, BLUE,Transmissive,Negative,Extened TEMP <input type="checkbox"/> STN, GREY,Transflective,Positive,Extened TEMP <input type="checkbox"/> STN, Yellow-GREEN,Positive,Extended TEMP
Driver Condition	LCD Module: 1/64Duty, 1/9Bias
Viewing Direction	6 O'clock
Backlight Type	<input type="checkbox"/> YELLOW-GREEN LED BL <input checked="" type="checkbox"/> WHITE EDGE LED BL <input type="checkbox"/> CCFL WHITE BL
Weight	TBD
Interface	8-bit/4-bit 6800/SPI MPU interface
Driver IC	Driver IC: ST7920

## 3.MACHANICAL SPECIFICATIONS

ITEM	SPECIFICATIONS	UNIT
OUTLINE DIMEMSIONS	72(L) X52(W) X 11max(H)(Include FFC) 72(L) X155(W) X 11max(H)(Include FFC)	mm
VIEWING AREA	55(L) x38(W)	mm



ACTIVE AREA	52.425(L) X 31.305(W)	mm
DISP.CONSTRUCTION	128 * 64 dots	---
DOT SIZE	0.355(L) x 0.435(W)	mm
DOT PITCH	0.405(L) x 0.49(W)	mm
ASSY.TYPE	COB	---
WEIGHT	TBD	g

Note : For detailed information please refer to LCM drawing

#### 4. ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD	Ta=25°C	-0.3	—	5.5	V
INPUT VOLTAGE	VIN	Ta=25°C	-0.3	—	7.0	V
OPERATION TEMPERATURE	TOPR	---	-20	—	+70	°C
STORAGE TEMPERATURE	TSTG	---	-30	—	+80	°C
Storage Humidity	H <sub>D</sub>	Ta < 40 °C	-		90	%RH

NOTES:

- (1) LCM should be grounded during handling LCM.

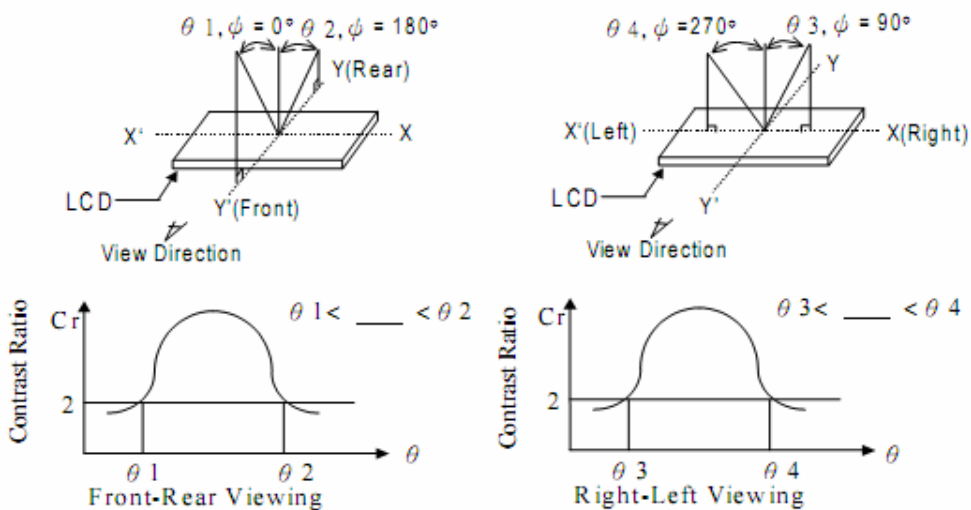
#### 5. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY VOLTAGE	VDD—VSS	Ta= +25°C	4.8	5.0	5.2	V
POWER SUPPLY FOR LCD DRIVING	V <sub>lcd</sub>	Ta= +25°C	-	9.0	-	V
INPUT VOLTAGE "H" LEVEL	V <sub>IH</sub>	—	0.8VDD	—	VDD	V
INPUT VOLTAGE "L" LEVEL	V <sub>IL</sub>	—	VSS	—	0.2VDD	V
OUTPUT VOLTAGE "H" LEVEL	V <sub>OH</sub>	I <sub>OH</sub> =-0.5mA	0.8VDD	—	VDD	V
OUTPUT VOLTAGE "L" LEVEL	V <sub>OL</sub>	I <sub>OL</sub> =0.5mA	VSS	—	0.2VDD	V
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = 5.0 V	-	3	5	mA
LCM Driver Voltage	V <sub>OP</sub>	V <sub>DD</sub> -V <sub>0</sub> (-20°C)	-	-	-	V
		V <sub>DD</sub> -V <sub>0</sub> (25°C)	-	9.0	-	
		V <sub>DD</sub> -V <sub>0</sub> (70°C)	-	-	-	



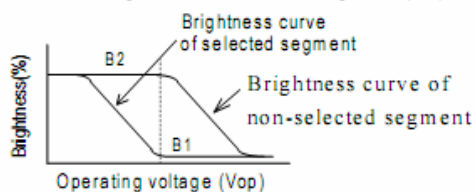
## 6.OPTICAL CHARACTERISTICS

### (1) DEFINITION OF VIEWING ANGLE

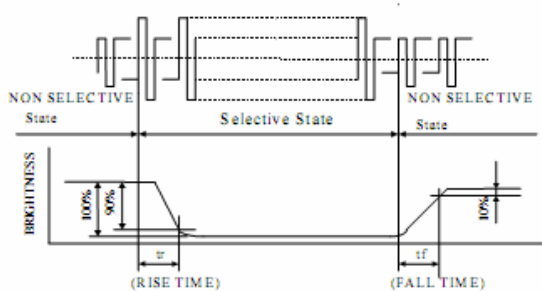


### (2) DEFINITION OF CONTRAST

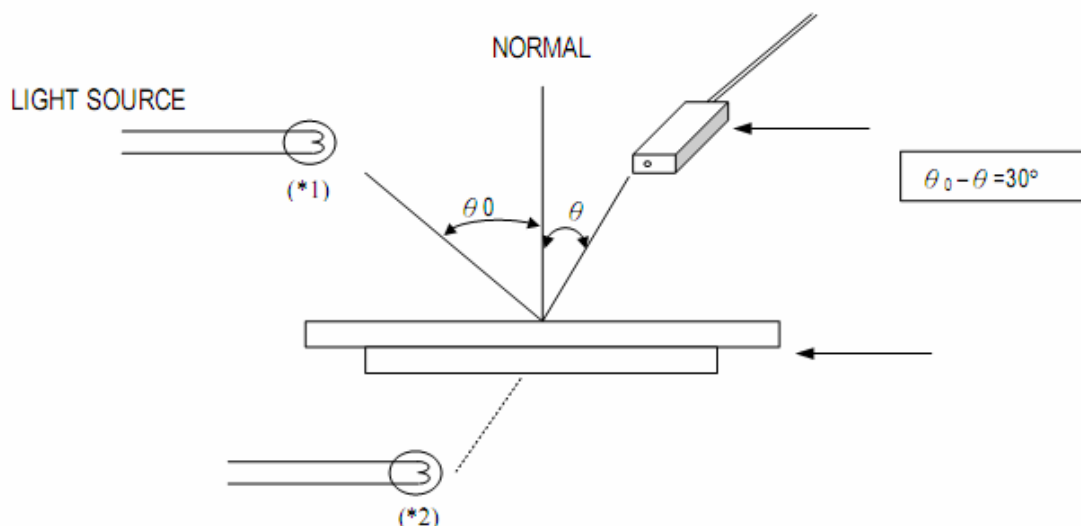
$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



### (3) DEFINITION OF RESPONSE



### (4) Measuring Instruments For Electro-optical Characteristics

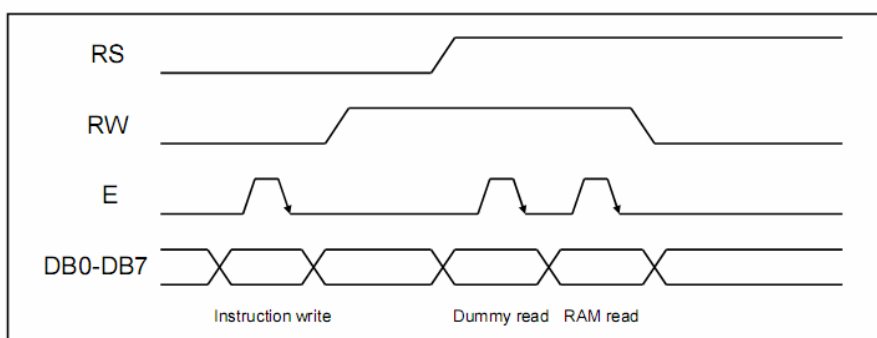


## 7.0 TIMING CHARACTERISTICS

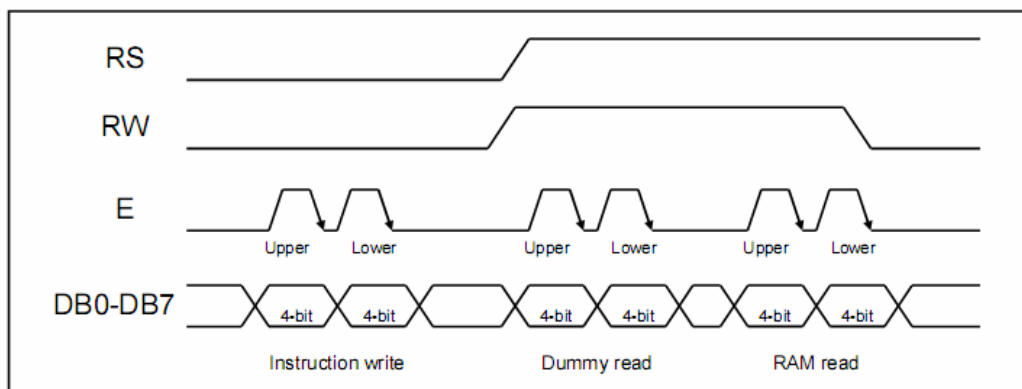
### Parallel interface:

ST7920 is in parallel mode by pulling up PSB pin. ST7920 can select 8-bit or 4-bit bus interface by setting the DL control bit in "Function Set" instruction. MPU can control RS, RW, E and DB0...DB7 pins to complete the data transmission.

In 4-bit transfer mode, every 8-bit data or instruction is separated into 2 parts. The higher 4 bits (bit-7~bit-4) data will be transferred first through data pins (DB7~DB4). The lower 4 bits (bit-3~bit-0) data will be transferred second through data pins (DB7~DB4). The (DB3~DB0) data pins are not used during 4-bit transfer mode.



Timing Diagram of 8-bit Parallel Bus Mode Data Transfer



Timing Diagram of 4-bit Parallel Bus Mode Data Transfer

**Serial interface:**

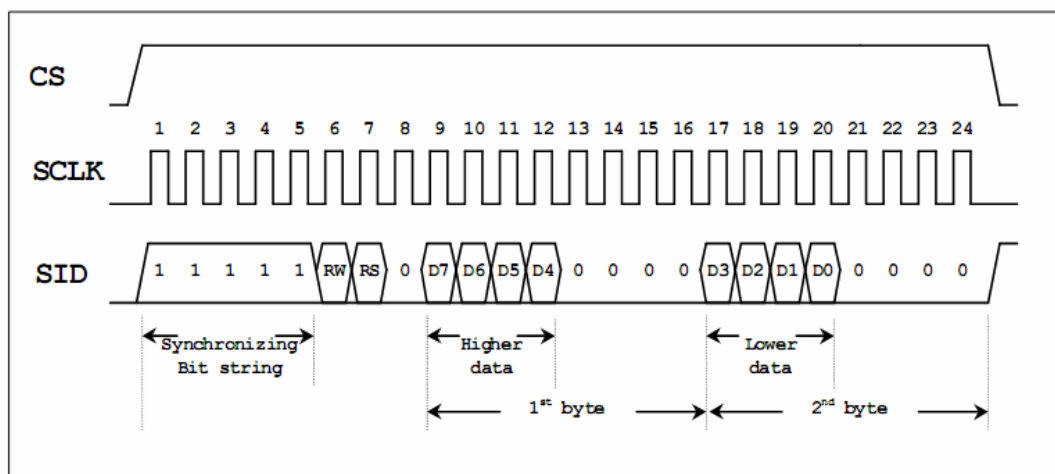
ST7920 is in serial interface mode when pulling down PSB pin. Two pins (SCLK and SID) are used to complete the data transfer. Only write data is available in the serial interface mode.

When connecting several ST7920, chip select (CS) must be used. Only when (CS) is high the serial clock (SCLK) can be accepted. On the other hand, when chip select (CS) is low ST7920 serial counter and data will be reset. Transmission will be terminated and data will be cleared. Serial transfer counter is set to the first bit. For a minimal system with only one ST7920 and one MPU, only SCLK and SID pins are necessary. CS pin should pull to high.

ST7920's serial clock (SCLK) is asynchronous to the internal clock and is generated by MPU. When multiple instruction/data is transferred, the instruction execution time must be considered. MPU must wait till the previous instruction is finished and then send the next instruction. ST7920 has no internal instruction buffer area.

When starting a transmission, a start byte is required. It consists of 5 consecutive "1" (sync character). Serial transfer counter will be reset and synchronized. Followed by 2-bit flag that indicates: read/write (RW) and register/data selected (RS) operation. Last 4 bits are filled by "0".

After receiving the sync character, RW and RS bits, every 8 bits instruction/data will be separated into 2 groups. Higher 4 bits (DB7~DB4) will be placed in the first section followed by 4 "0"s. And lower 4 bits (DB3~DB0) will be placed in the second section followed by 4 "0"s.



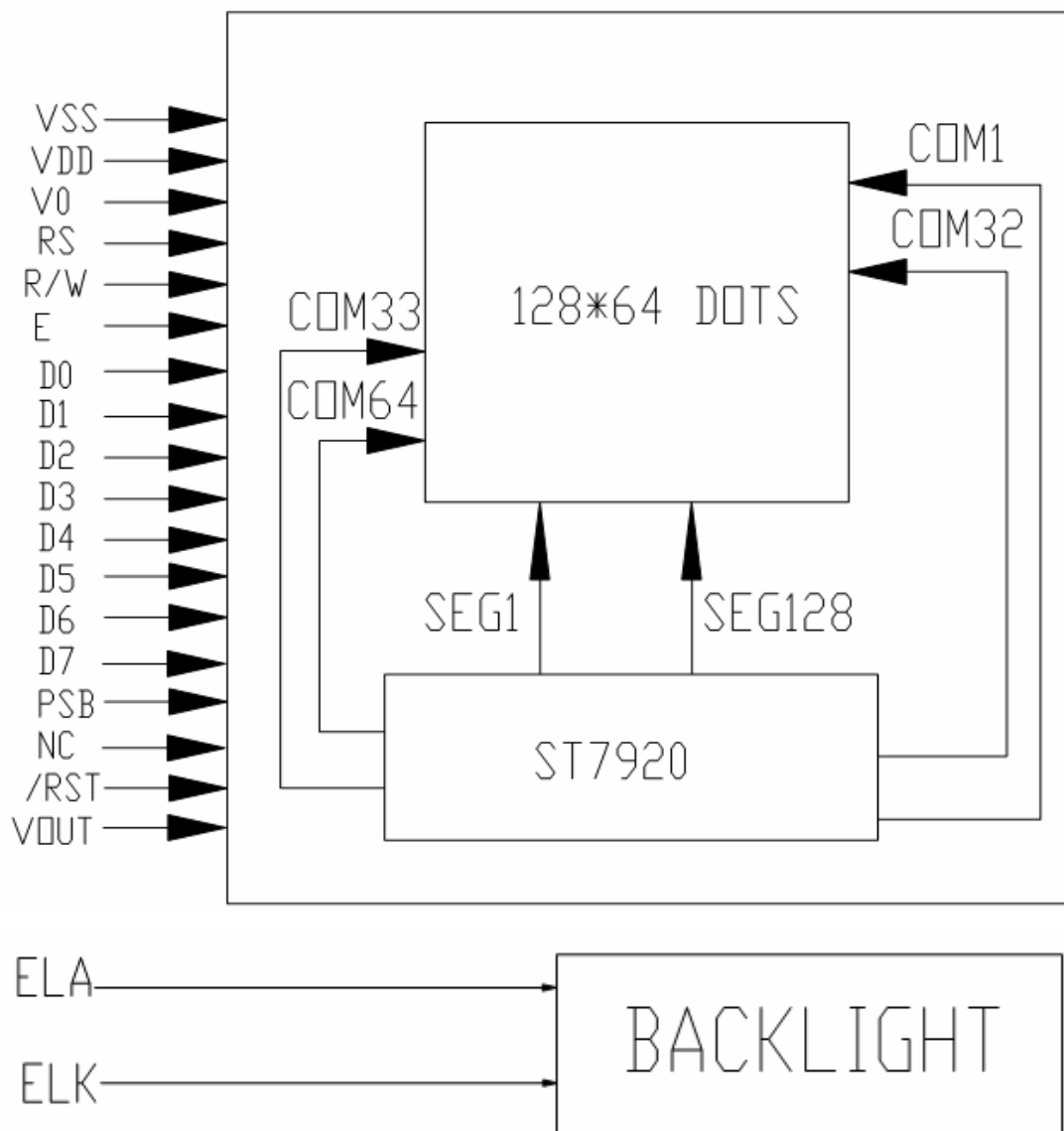
Timing Diagram of Serial Mode Data Transfer



## 8.PIN ASSIGNMENT

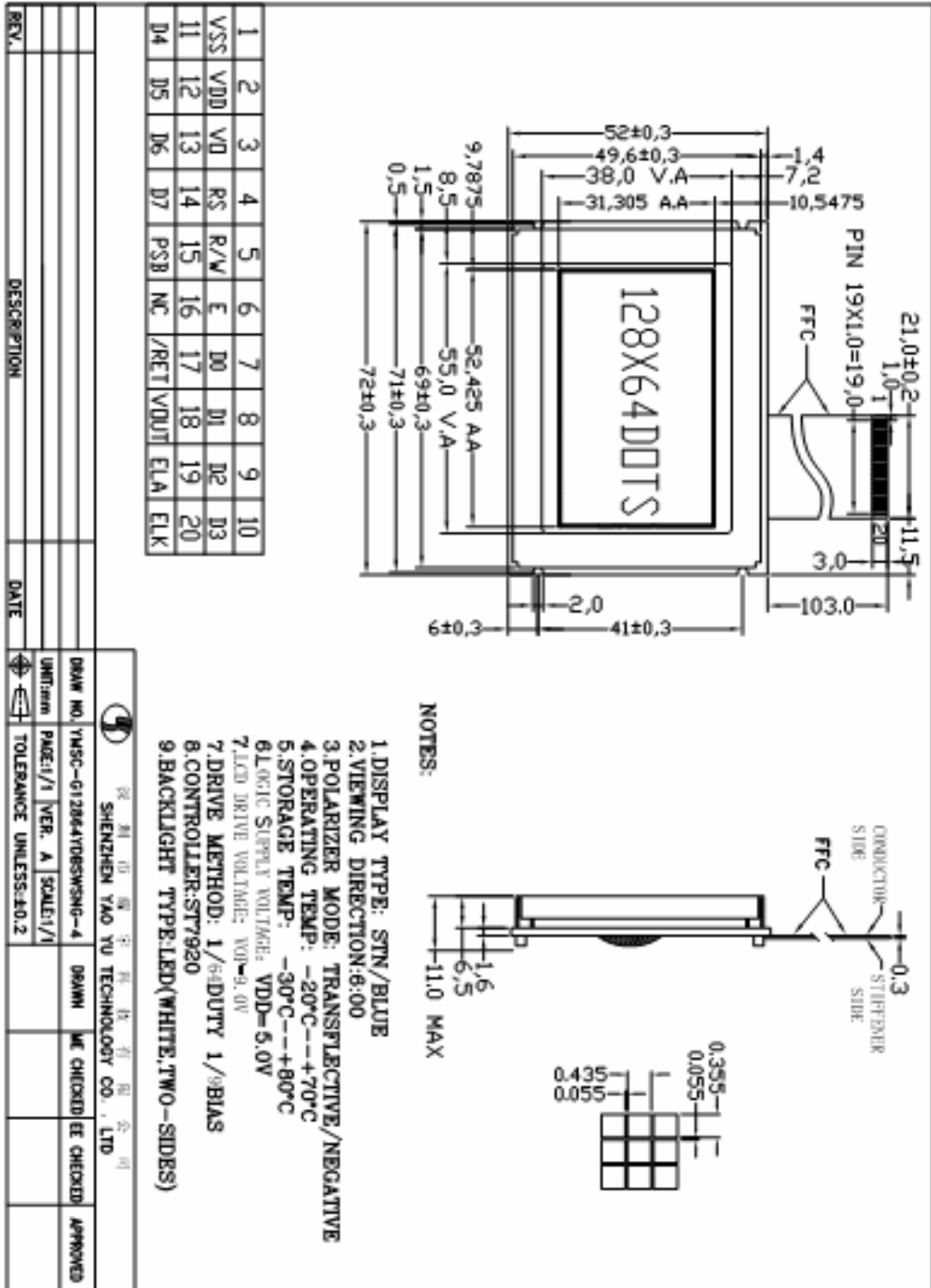
Pin No.	Symbol	I/O	Description
1	VSS	I	Ground
2	VDD	I	Power Supply Voltage
3	VO	I	LCD Driver Voltage Input Terminal
4	RS	I	<b>Parallel Mode:</b> Register select. 0: Select instruction register (write) or busy flag, address counter (read); 1: Select data register (write/read). <b>Serial mode:</b> Chip select. 1: chip enabled; 0: chip disabled.
5	R/W	I	<b>Parallel Mode:</b> Read/Write control. 0: Write; 1: Read. <b>Serial Mode:</b> Sserial data input.
6	E	I	<b>Parallel Mode:</b> 1: Enable trigger. <b>Serial Mode:</b> Serial clock.
7~~14	D0~~D7	I/O	Data Bus
15	PSB	I	Interface selection: 0: serial mode; 1: 8/4-bit parallel bus mode.
16	NC	I	NO CONNECTOR
17	/RET	I	Reset Signal
18	VOUT	O	Booster Output
19	ELA	I	Backlight+Terminal
20	ELK	I	Backlight-Terminal

**9.BLOCK DIAGRAM**





10. OUTLINE DIMENSIONS





## 11. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

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

## 12. RELIABILITY

### 12-1 RELIABILITY TEST

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERATURE +70°C 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE -20°C 240HRS	
STORAGE TEMPERATURE	HIGH TEMPERATURE +80°C 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE - 30°C 240HRS	
HUMIDITY	40°C 90%RH 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	<ul style="list-style-type: none"> <li>• Operating Time: thirty minutes exposure for each direction (X,Y,Z)</li> <li>• Sweep Frequency: 10~55Hz (1 min)</li> <li>• Amplitude: 1.5mm</li> </ul>	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	-20°C (30mins) ↔ +70°C (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°C, 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