DOCUMENT NUMBER AND REVISION

FS-GP001-JCG12832A08-01 REV. A

(FFPNNMNG-06-ST-NSC)

DOCUMENT TITLE:F

SPECIFICATION

OF

LCD MODULE TYPE

CUSTOMER	
MODEL NUMBER	**GP001-JCG12832A08-01**
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	ZHU LING JUN		
CHECKED BY	XIE DAI ZHOU		
APPROVED BY	WANG ZHAO CAI		

DOCUMENT REVISION HISTORY 1:

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
A	2006.03.24	First Release.	ZHU LING JUN	XIE DAI ZHOU

CONTENTS

Specification of LCD Module Type
Item No.: GP001-JCG12832A08-01

1. General Description

- 128 x 32 Dots FSTN Positive Transflective Dot Matrix LCD Module.
- Viewing Angle: 6 O'clock direction.
- Driving duty: 1/33 Duty, 1/5 bias.
- 'SITRONIX' ST7565P LCD Controller &Driver or equivalent.
- Chip on Glass (COG).
- High-speed 8-bit MPU interface.
- Power Supply: +3.0V.
- FPC.
- Management Regulations for FindLCD's Environment –related Substances to be controlled (the detail is shown in Table1).

Table 1

NO.	The six kinds of content injurants（ppm）--- test way of ICP					
	Cadmium/cadmium compounds	Lead and lead compounds	Mercury and mercury compounds	Hexavalent chromium compounds	Polybrominated biphenyls (PBB)	Polybrominated diphenylethers (PBDE)
GP001	5	Plastic 100	100	100	100	100

Note: Substances for no listed in table must accord with the standard of JHD's Environment –related Substances to be controlled.

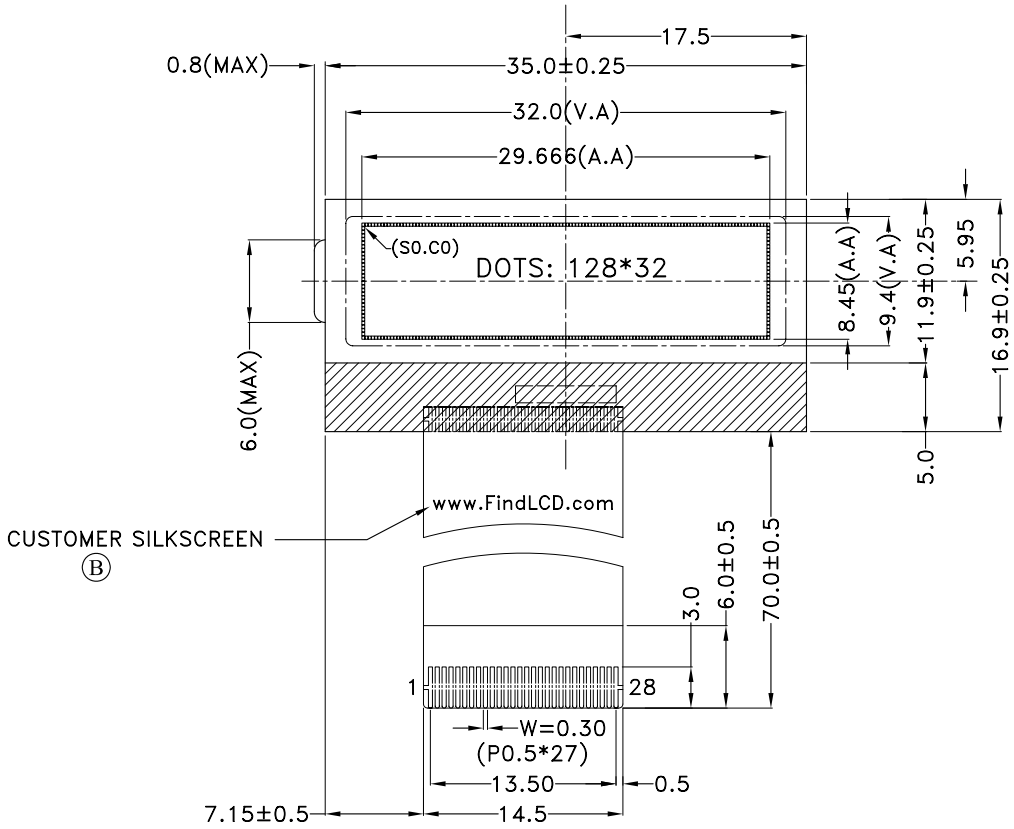
2. Mechanical Specifications

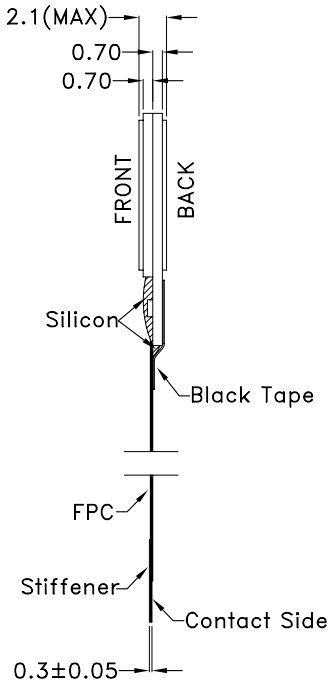
The mechanical detail is shown in Fig. 1 and summarized in Table 2 below.

Table 2

Parameter	Specifications	Unit
Outline dimensions	35.0 (W) x 16.9(H) x 1.8MAX.(D)(Exclude FPC) 35.0 (W) x 35.3(H) x 1.8MAX.(D)(Include FPC)	mm
Viewing area	32.00MIN (W) x 9.4MIN(H)	mm
Display format	128 x 32	dots
Dot size	0.202(W) x 0.235(H)	mm
Dot spacing	0.030(W) x 0.030(H)	mm
Dot pitch	0.232 (W) x 0.265 (H)	mm
Weight:	TBD	grams

ISSUE	MODIFY DESCRIPTION	DATE
A	First Issue	06.07.25
B	SEE Ⓑ	06.08.08



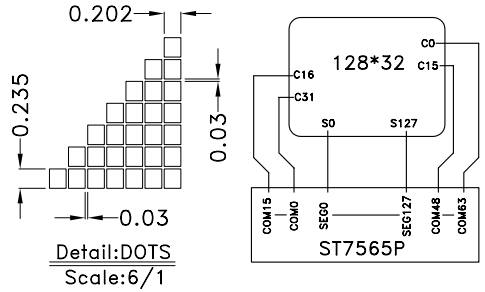


FPC ASSIGNMENT

1	VDD	15	VSS
2	C86	16	D7
3	VSS	17	D6
4	V0	18	D5
5	V1	19	D4
6	V2	20	D3
7	V3	21	D2
8	V4	22	D1
9	C2−	23	D0
10	C2+	24	/RD
11	C1+	25	/WR
12	C1−	26	A0
13	C3+	27	/RES
14	VOUT	28	/CS1

NOTE:
Marked with "()" are referenced

Display Type	FSTN/ TRANSFLECTIVE / POSITIVE
Display Resolution	128*32
Viewing Angle	12:00
Max.Ratio and Bias Level	1/33 DUTY,1/5 BIAS
LCD Controller/Driver	ST7565P(COG)
Logic Voltage	3.0V
LCD Driving Voltage	TBD
Operation Temperature	-20°C TO 70°C
Storage Temperature	-30°C TO 80°C
Backlight Speciality	No
Remark	Parallel 6800 or 8080 timing



www.FindLCD.com

TITLE:	Module Speciality
ITEM NO:	M1290
PROJECT NO:	GP002-JCG12832A05-02
DESCRIPTION:	
TOLERANCE UNLESS:	X.X±0.3
OTHERWISE SPECIFIED:	X.XX±0.2
	THIRD ANGLE PROJECTION

	NAME	SIGN	DATE
DRAWN	Yin xiao lian		06.08.08
CHECKED	Li hua ming		
APPROVED	Wang zhao cai		
REV: B	UNIT: mm	SCALE:1/1	SHEET: 1 OF 1

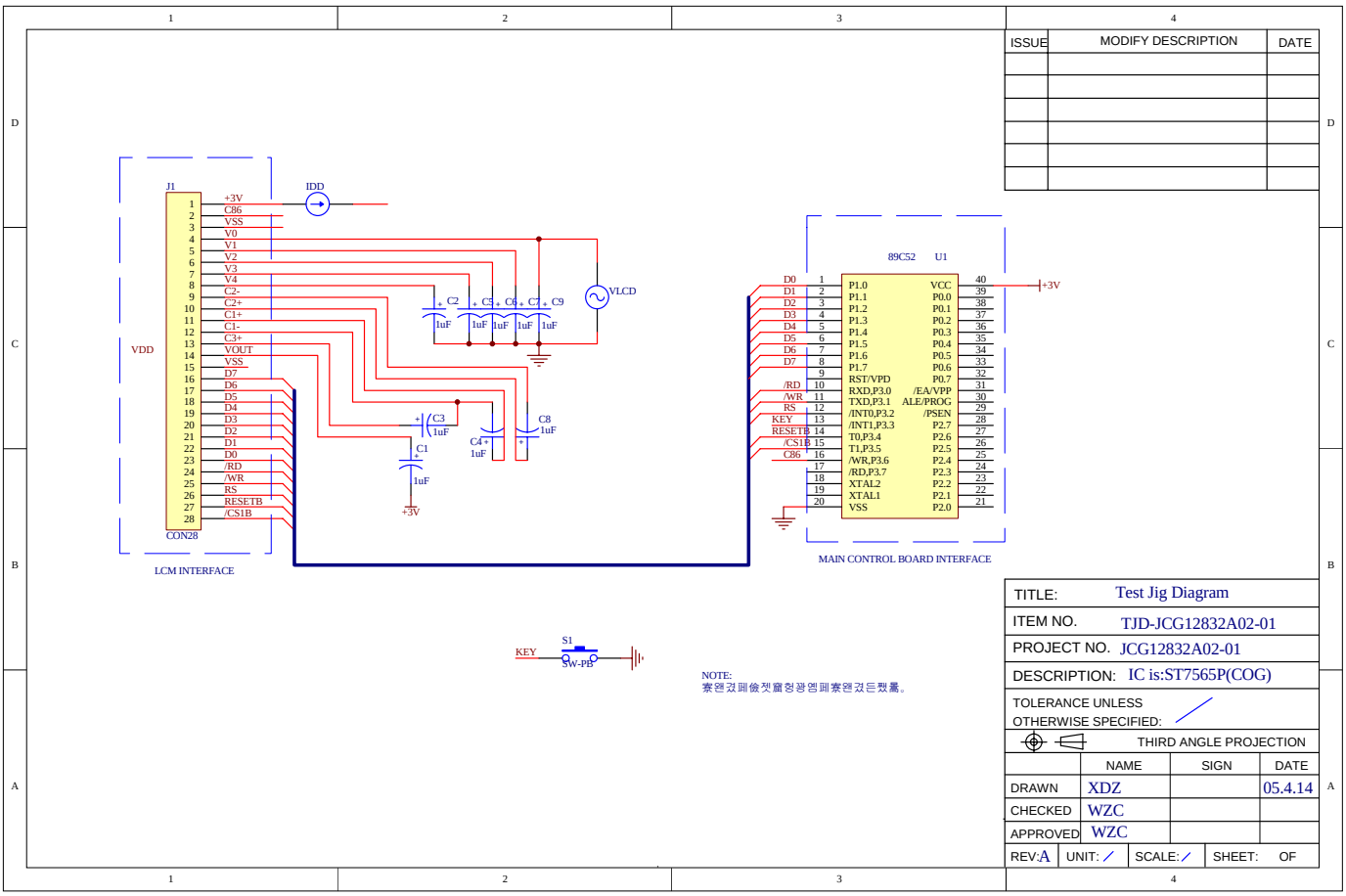


Figure 2: Recommend the outer circuit

3. Interface signals

Table 3(a)

Pin No.	Symbol	Description
1	VDD	Power supply for logic +3.0V.
2	C86	This is the MPU interface switch terminal. C86 = "H": 6800 Series MPU interface. C86 = "L": 8080 MPU interface.
3	VSS	Ground (0V).
4	V0	This is a multi-level power supply for the liquid crystal drive. The voltage Supply applied is determined by the liquid crystal cell, and is changed through the use of a resistive voltage divided or through changing the impedance using an op. amp. Voltage levels are determined based on VSS, and must maintain the relative magnitudes shown below. V0 ≧V1 ≧V2 ≧V3 ≧V4 ≧VSS When the power supply turns ON, the internal power supply circuits produce the V1 to V4 voltages shown below. The voltage settings are selected using the LCD bias set command. V1=(1/5)V0, V2=(2/5)V1, V3=(3/5)V2, V4=(4/5)V0
5	V1	
6	V2	
7	V3	
8	V4	
9	C2-	DC/DC voltage converter. Connect a capacitor between this terminal and the C2+ terminal.
10	C2+	DC/DC voltage converter. Connect a capacitor between this terminal and the C2- terminal.
11	C1+	DC/DC voltage converter. Connect a capacitor between this terminal and the C1+ terminal.
12	C1-	DC/DC voltage converter. Connect a capacitor between this terminal and the C1- terminal.
13	C3+	DC/DC voltage converter. Connect a capacitor between this terminal and the C1- terminal.
14	VOUT	DC/DC voltage converter. Connect a capacitor between this terminal and VSS or VDD
15	VSS	Ground (0V).
16	D7	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. When the chip select is not active, D0 to D7 are set to high impedance.
17	D6	
18	D5	
19	D4	
20	D3	
21	D2	
22	D1	
23	D0	
24	/RD	• When connected to an 8080 MPU, this is active LOW. (E) This pin is connected to the /RD signal of the 8080 MPU, and the ST7565P 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.

Table 3(b)

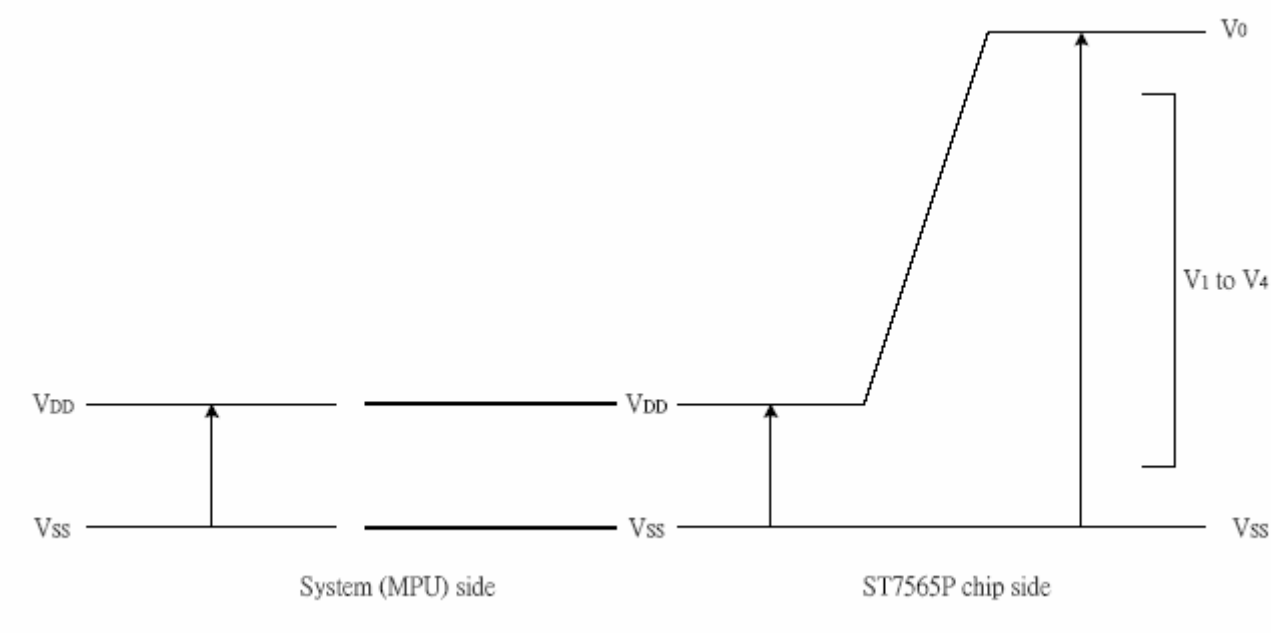
Pin No.	Symbol	Description
25	/WR	• When connected to an 8080 MPU, this is active LOW. (R/W) This terminal connects to the 8080 MPU /WR signal. The signals on the data bus are latched at the rising edge of the /WR signal. • When connected to a 6800 Series MPU: This is the read/write control signal input terminal. When R/W = "H": Read. When R/W = "L": Write.
26	A0	This is connect to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or a command. A0= "H": Indicates that D6, D7 are display data. A0= "L": Indicates that D6, D7 are control data.
27	/RES	When /RES is set to "L," the settings are initialized. The reset operation is performed by the /RESB signal level.
28	/CS1	This is the chip select signal. When /CS1 = "L" and CS2 = "H," then the chip select becomes active, and data/command I/O is enabled.

4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings (Ta = 25 ºC)

Table 4

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	VDD - VSS	-0.3	+5.0	V
Power Supply voltage (LCD drive)	V0, VOUT	-0.3	+18.0	V
	V1, V2, V3, V4	V0	+0.3	V



Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.

1. All voltage values are referenced to VSS = 0V.

2.Insure that the voltage levels of V1, V2, V3, and V4 are always such that

VOUT ≧ V0 ≧ V1 ≧ V2 ≧ V3 ≧ V4.

4.2 Environmental Condition

Table 5

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	-10°C	+60°C	-20°C	+70°C	Dry

5. Electrical Specifications

5.1 Typical Electrical Characteristics

At Ta = 25 °C, VDD = 3.0V±0.1V, VSS=0V.

Table 6

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-VSS		2.9	3.0	3.1	V
Supply voltage (LCD)	VLCD = V0-VSS	VDD =+3.0V, Note 1	5.2	5.4	5.6	V
Input signal voltage for A0,/RD,/WR,D0---D7, /CS1, /RES, C86 pins.	V_{IH}	"H" level	0.8VDD	-	VDD	V
	V_{IL}	"L" level	VSS	-	0.2VDD	V
Supply Current (Logic & LCD)	IDD	Note 1	-	0.4	0.6	mA

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

5.2 Timing Specifications

At Ta = -10°C To +60 °C, VDD = +3.0V±0.1V, VSS = 0V.

Refer to Fig. 3, the bus timing diagram for the 8080 series MPU.

Table 7

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH8}		0	—	Ns
Address setup time		t_{AW8}		0	—	
System cycle time		t_{CYC8}		240	—	
Enable L pulse width (WRITE)	WR	t_{CCLW}		80	—	
Enable H pulse width (WRITE)		t_{CCHW}		80	—	
Enable L pulse width (READ)	RD	t_{CCLR}		140	—	
Enable H pulse width (READ)		t_{CCHR}		80		
WRITE Data setup time	D0 to D7	t_{DS8}		40	—	
WRITE Address hold time		t_{DH8}		0	—	
READ access time		t_{ACC8}	C_L = 100 pF	—	70	
READ Output disable time		t_{OH8}	C_L = 100 pF	5	50	

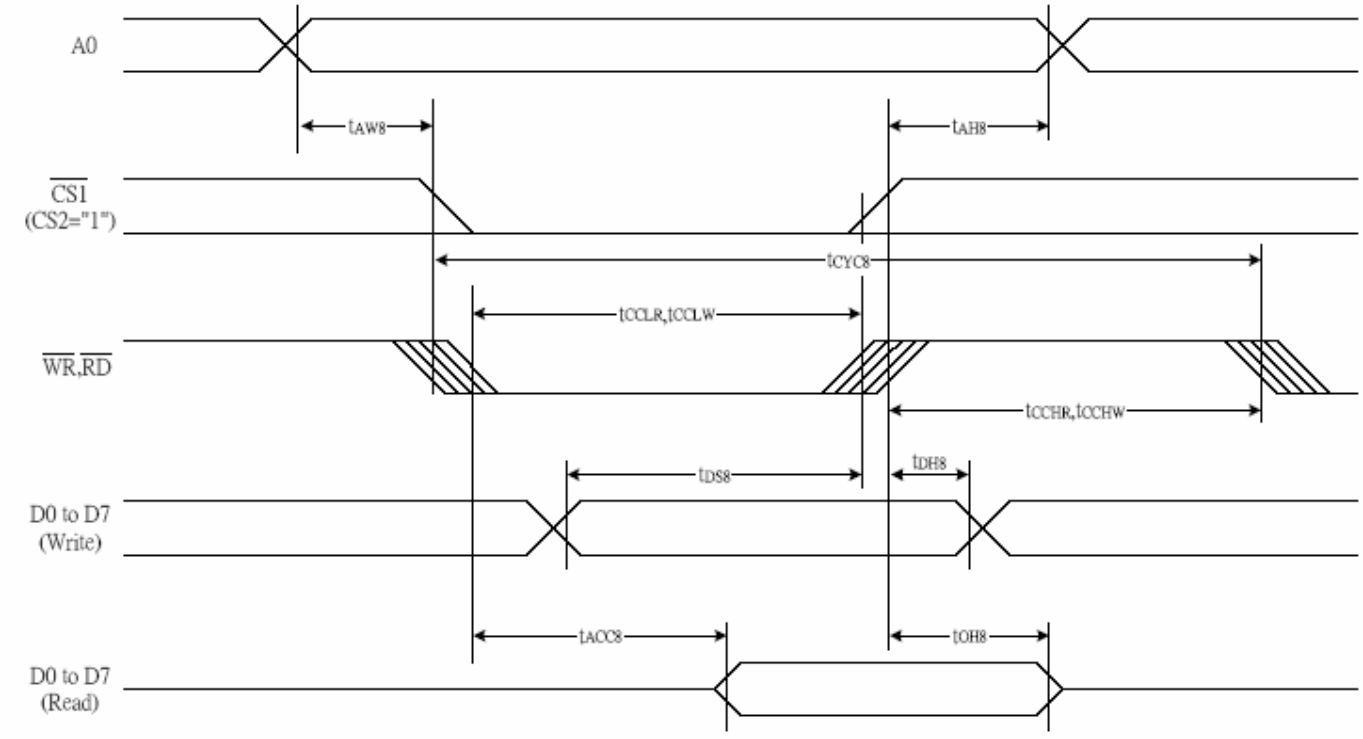


Figure 3: The 8080 series MPU timing

At Ta = -10°C To +60°C, VDD = +3.0V±0.1V, VSS = 0V.

Refer to Fig. 4, the bus timing diagram for the 6800 series MPU.

Table 8

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_{EWHW}		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 = 100 pF	—	70	
READ Output disable time		t_{OH6}	C_L = 100 pF	5	50	

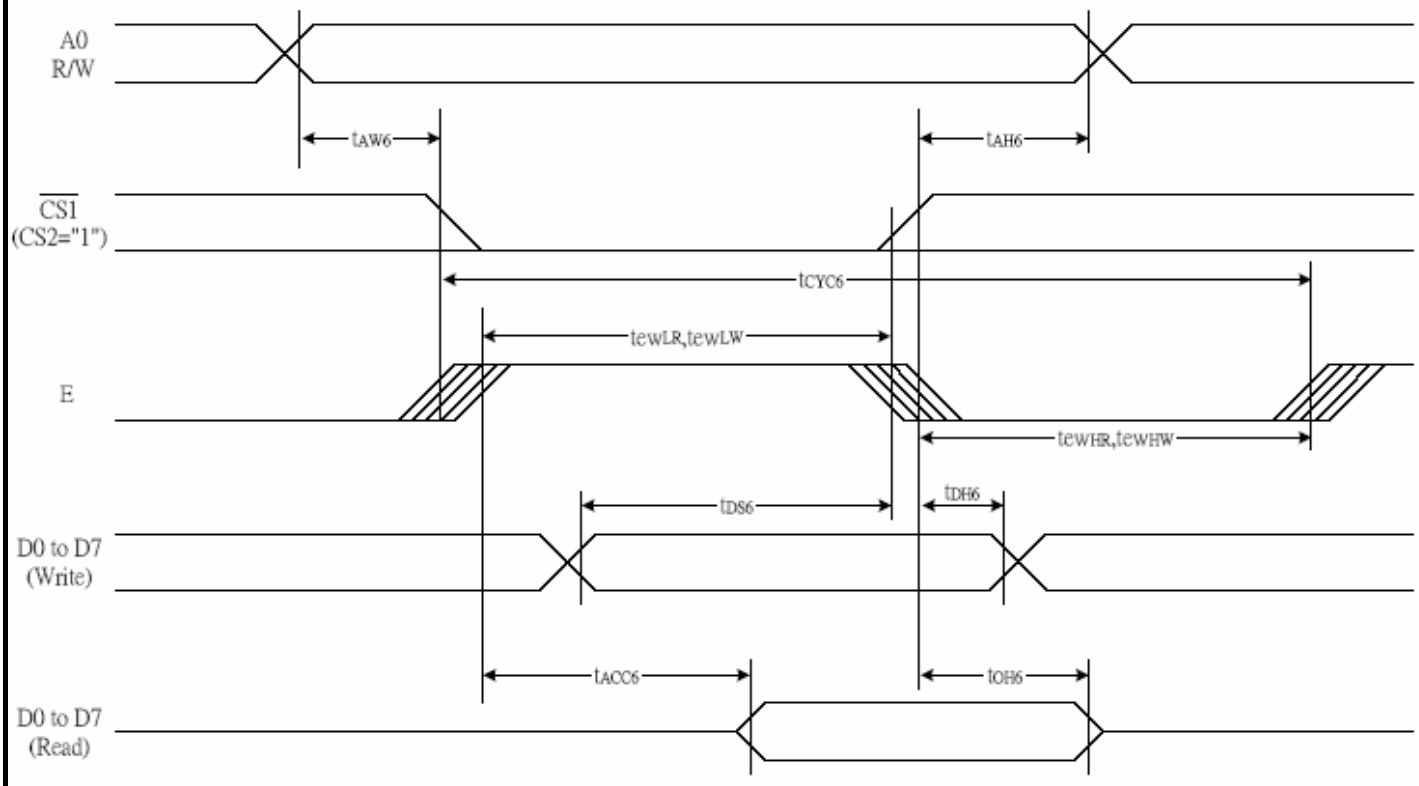


Figure 4: The 6800 series MPU timing

At Ta = -10 °C To +60°C, VDD = +3.0V±0.1V, VSS = 0V.

Refer to Fig. 5, the bus timing diagram for reset timing.

Table 9

Item	Signal	Symbol	Condition	Rating			Units
				Min.	Typ.	Max.	
Reset time		t_R		—	—	1.0	us
Reset "L" pulse width	/RES	t_{RW}		1.0	—	—	us

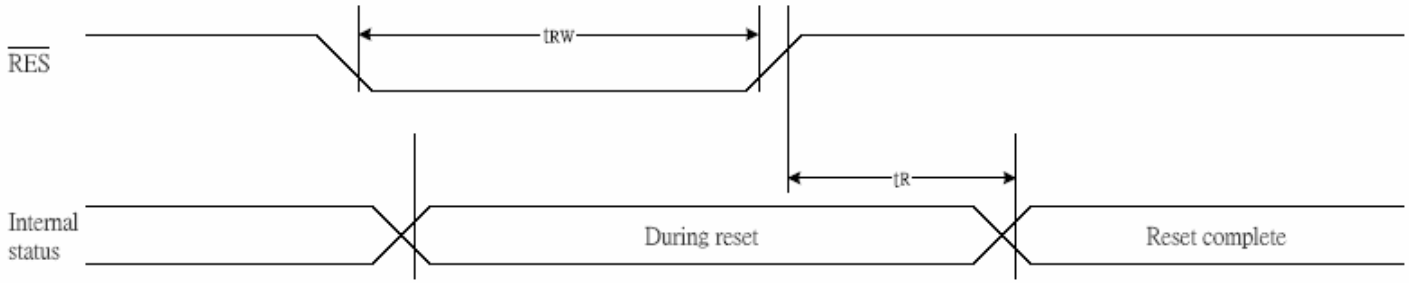


Figure 5: Reset Timing

Note: 1. All timing is specified with 20% and 80% of VDD as the standard.
2.The input signal rise and fall time (tr, tf) are specified at 15 ns or less.

5.3 Instruction Table

Table 10

Command	Command Code										Function
	A0	/RD	/WR	D7	D6	D5	D4	D3	D2	D1	D0	
(1) Display ON/OFF	0	1	0	1	0	1	0	1	1	1	0 1	LCD display ON/OFF 0: OFF, 1: ON
(2) Display start line set	0	1	0	0	1	Display start address						Sets the display RAM display start line address
(3) Page address set	0	1	0	1	0	1	1	Page address				Sets the display RAM page address
(4) Column address set upper bit Column address set lower bit	0 0	1 1	0 0	0 0	0 0	0 0	1 0	Most significant column address Least significant column address				Sets the most significant 4 bits of the display RAM column address. Sets the least significant 4 bits of the display RAM column address.
(5) Status read	0	0	1	Status				0	0	0	0	Reads the status data
(6) Display data write	1	1	0	Write data								Writes to the display RAM
(7) Display data read	1	0	1	Read data								Reads from the display RAM
(8) ADC select	0	1	0	1	0	1	0	0	0	0	0 1	Sets the display RAM address SEG output correspondence 0: normal, 1: reverse
(9) Display normal/ reverse	0	1	0	1	0	1	0	0	1	1	0 1	Sets the LCD display normal/ reverse 0: normal, 1: reverse
(10) Display all points ON/OFF	0	1	0	1	0	1	0	0	1	0	0 1	Display all points 0: normal display 1: all points ON
(11) LCD bias set	0	1	0	1	0	1	0	0	0	1	0 1	Sets the LCD drive voltage bias ratio 0: 1/9 bias, 1: 1/7 bias (ST7565P)
(12) Read/modify/write	0	1	0	1	1	1	0	0	0	0	0	Column address increment At write: +1 At read: 0
(13) End	0	1	0	1	1	1	0	1	1	1	0	Clear read/modify/write
(14) Reset	0	1	0	1	1	1	0	0	0	1	0	Internal reset
(15) Common output mode select	0	1	0	1	1	0	0	0 1	*	*	*	Select COM output scan direction 0: normal direction 1: reverse direction
(16) Power control set	0	1	0	0	0	1	0	1	Operating mode			Select internal power supply operating mode
(17) V0 voltage regulator internal resistor ratio set	0	1	0	0	0	1	0	0	Resistor ratio			Select internal resistor ratio(Rb/Ra) mode
(18) Electronic volume mode set Electronic volume register set	0	1	0	1 0	0 0	0 Electronic volume value	0	0	0	0	1	Set the V0 output voltage electronic volume register
(19) Static indicator ON/OFF Static indicator register set	0	1	0	1 0	0 0	1 0	0 0	1 0	1 0	0 0	0 1 Mode	0: OFF, 1: ON Set the flashing mode
(20) Booster ratio set	0	1	0	1 0	1 0	1 0	1 0	1 0	0 0	0 step-up value	0	select booster ratio 00: 2x,3x,4x 01: 5x 11: 6x
(21) Power saver												Display OFF and display all points ON compound command
(22) NOP	0	1	0	1	1	1	0	0	0	1	1	Command for non-operation
(23) Test	0	1	0	1	1	1	1	*	*	*	*	Command for IC test. Do not use this command

6. Quality Units

GEMINI Technology Co., Ltd.

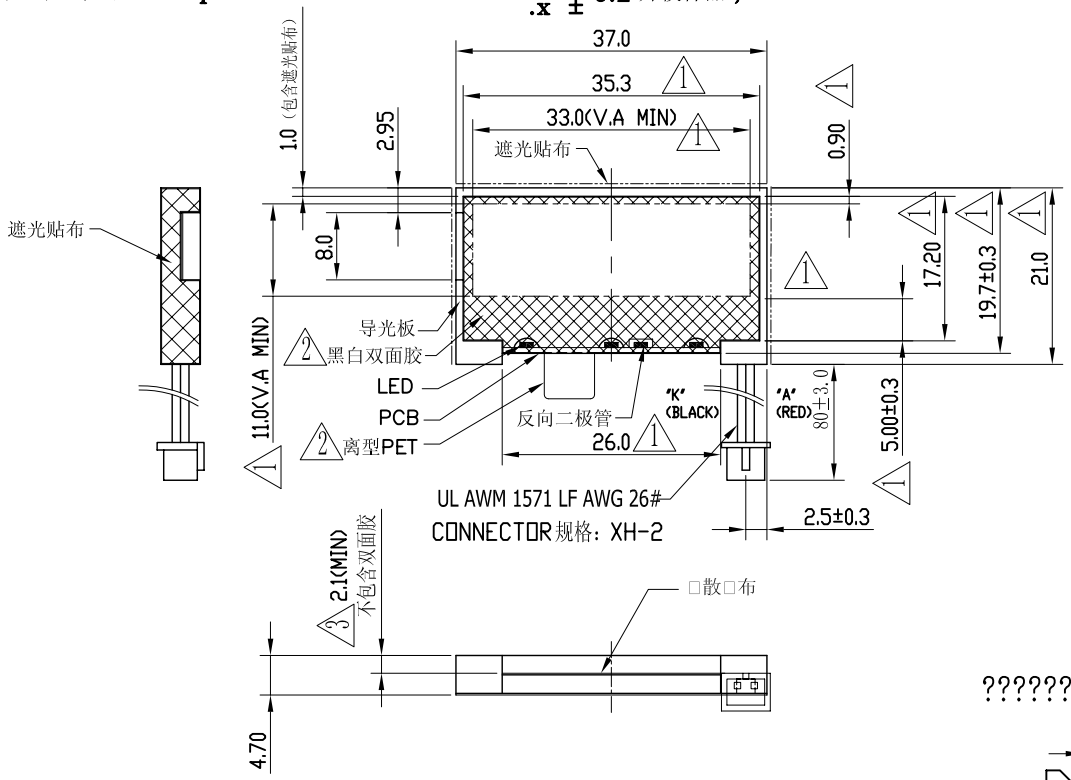
日期 Date: 2006-07-21

LED BACKLIGHT
FOR LCD DISPLAY

1. 结构尺寸 MECHANICAL OUTLINE

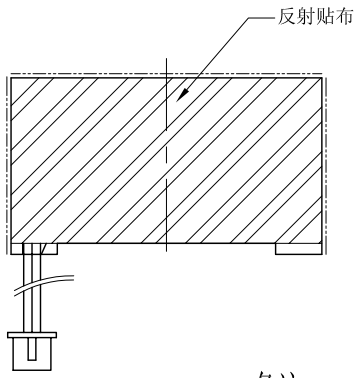
COLOR : WHITE
颜色 ：白色

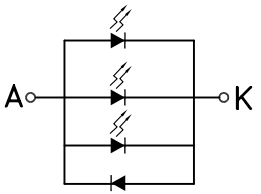
(未注尺寸公差 Unspecified Tolerances is: .xx ± 0.2 .x ± 开模样品)



2. 电路图 CIRCUIT DIAGRAM (LED 1*3=3 dies)

电气原理图

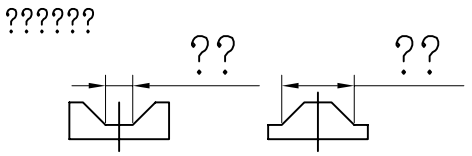




1N4148

备注：

1. 此产品为环保无铅。



请确认以下参数		客户确认
外型结构尺寸	见本页	
电性能参数	见第二页	
亮度及均匀性	见第二页	
色 坐 标	见第三页	

3. 保存和焊接条件 STORAGE & SOLDERING CONDITIONS:

- **Store with care. Storing the units in bad condition will cause the reflector sheet and decrease it's adhesive power. Storage. The products under the condition: temperature (25°c±10°C) and humidity (65%RH±20%RH) our recommendation.**
- 注意保存.保存条件不好时,会降低反光膜(扩散膜)与导光片(反射壳)的粘附力. 推荐保存条件为: 温度 **25°C±10°C** 湿度 **65%RH±20%RH**

ISSUE 标识	AMENDMENT 改正内容	Date: 日期
1	根据客户要求去除四个耳朵结构、更改7处尺寸、增加2处尺寸。	2006-07-25
2	根据客户要求在背光正面使用黑白双面胶并增加PET把柄。	2006-08-08
3	根据客户要求更改挡墙高度。	2006-08-17

Drawing No: 图号:	P539W	REV: 版本	S4

DESIGN: 设计 董水清
CHECKED: 检查
COUNTERSIGN: 会签
APPROVED: 批准

- The Soldering Temperature is 260±5°C and Soldering Time should be less than 3 sec,and soldering iron power should be less than 30W.
- The soldering point should be farther than 1.6mm from body .
- 焊接温度 260°C±5°C, 焊接时间小于 3 秒, 烙铁功率小于 30W.
- 焊接点应离产品实体大于 1.6 mm.

4. 极限参数 ABSOLUTE MAXIMUM RATINGS (除非特别说明, 环境温度 Ta=25°C. Unless specified,The Ambient temperature Ta=25°C)

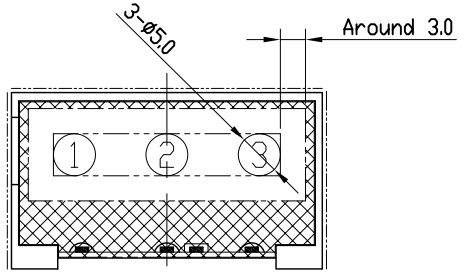
项目 Item	符号 Symbel	条件 Conditions	值 Rating	单位 Unit
* 极限直流正向电流 Absolute maximum forward current	Ifm		20*3	mA
* 脉冲驱动时极限正向电流 Peak forward current	Ifp	1 msec 脉冲,1/10 占空比 1 msec Plus 10% Duty Cycle	60*3	mA
反向电压 Reverse Voltage	Vr		3	V
* 极限功耗 Power dissipation	Pd		75*3	mW
工作温度 Operating Temperature Range	Topr		−30~+70°C	°C
贮存温度 Storage Temperature Range	Tstg		−40~+80°C	°C

* 当工作温度高于25°C 时, Ifm、Ifp 和 Pd 必须降低; 电流降低率是-0.36*3 mA/°c(直流驱动), 或-0.86*3 mA/°c(脉冲驱动), 功耗降低率是 -0.75*3 mW/°C.产品的工作电流不能大于对应工作温度条件 Ifm 或 Ifp 的 60 %.

For operation above 25°C,The Ifm Ifp & Pd must be derated,the Curent derating is-0.36*3 mA/°c for DC drive and-0.86*3 mA/°c for Pulse drive,the Power dissipation is -0.75*3 mW/°c. The product working current must not more than the 60 % of the Ifm or Ifp according to the working temperature.

电.光特性 ELECTRICAL−OPTICAL CHARACTERISTICS (除非特别说明, 环境温度 Ta=25°C. Unless specified,The Ambient temperature Ta=25°C)

项目 Item	符号 Symbol	最小值 min.	典型值 typ.	最大值 max.	单位 Unit	测定条件 Condition
正向电压 Forward Voltage	Vf	2.9	3.2	3.5	mA	If= 45 mA
反向电流 Reverse Current	Ir			15	μA	Vr= 3 V
峰值波长 Peak wave length	λP				nm	If= 45 mA
频谱半宽度 Spectral Line Half width	△λ				nm	If= 45 mA
* 亮度 Luminance	Lv				cd/m²	If= 45 mA
* 均匀性 Lvmin/Lvmax		65			%	If= 45 mA



* 亮度值是 3 个测量点的平均值, 使用BM−7亮度色度仪测量, 测量光圈ø 5 mm.
The luminance is the average value of 3 points, The measurement instrument is BM−7 luminance, Colorimeter.The aperture is ø5 mm.

6. STATIC ELECTRICITY AND SURGE（静电、击穿）

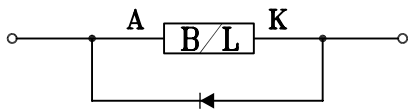
* Static electricity and surge will damage the LEDs. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
（静电冲击将损坏发光二极管，在处理LED时推荐使用静电手环、手指套）

* All devices, equipment and machinery must be properly grounded.（所有设备外壳必须接地）

* When inspecting own final products on which LEDs were mounted, it is recommended to check also whether the mounted LEDs are damaged by static electricity or not. It is easy to find static-dimaged LEDs by light emission test at lower current (below 1mA is recommended).
Damaged LEDs will show some unusual characteristics such as leak current remarkably increases, starting forward voltage becomes lower, or the LEDs get unlighted at the low current.〔在检查带有LED背光产品时，建议检验LED是否被静电损坏，在很低电流下通过点亮试验就能发现发光二极管(LED)被损坏（一般推荐1mA以下）损坏的LED呈现的特性：反向漏电流增大、正向电压偏低、低电流时不亮〕

7. RECOMMEND CONNECTION OF STATIC-ELECTRICITY RESISTANCE

* This circuit diagram is a common ESD protection circuit for all super bright blue,white and green color LED backlight application.

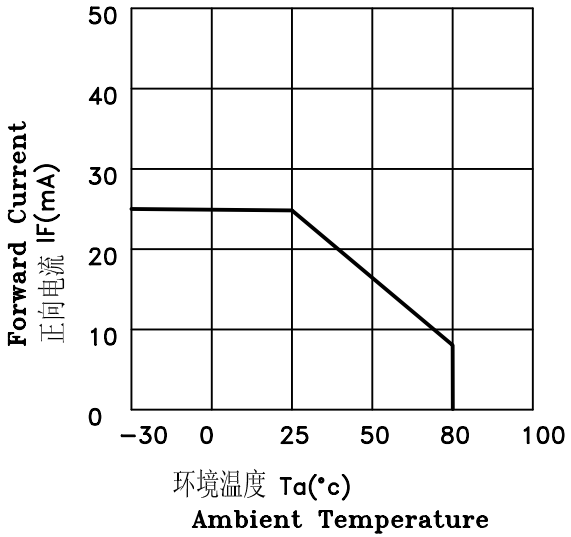


Protective Diode

8. LED ELECTRICAL CHARACTERISTICS

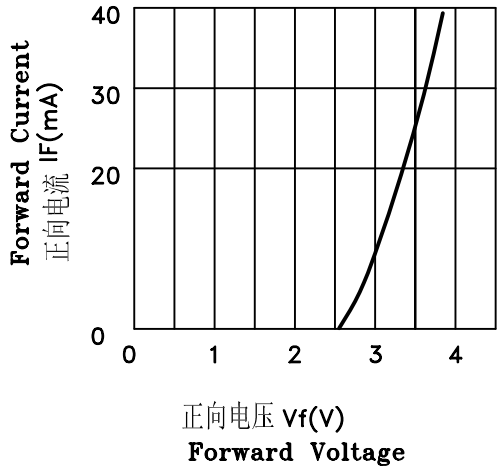
(1) 正向电流-周围温度

Forward Current VS. Ambient Temperrature



(2) 正向电流-正向电压特性

Forward Current VS. Forward Voltage



9. 色度坐标 CHROMATICS COORDINATES

X： 0.265-0.325

Y： 0.270-0.335