AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY

PART NUMBER: AGM1264R Series

REVISED: FEB 14, 2007

1. General Specifications

1. Features

A. Drive Method: 1/64 Duty, 1/9 Bias

B. The Module Operating Voltage: 3.3V;

C. The LCD Operating Voltage : 9.7V;

D. Viewing Direction: 6:00h

E. Operating Temperature: -20℃~70℃

F. Storage Temperature: -30℃~85℃

G. Display mode: FSTN mode, positive type display

2. Characteristics of backlight (LED unit)

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	VF	2.85	3.2	3.5	V	IF=90mA
Forward Current	IF		90	120	mA	
Luminous	LV		60		cd/m^2	IF=90mA
Color	BLUE					

WARNING:

A BACKLIGHT IS A KIND OF CURRENT DEVICE,IT MUST CONNECT A RESISTANCE FOR LIMITING CURRENT ,OR IT WILL BE DAMAGED.

3. Mechanical Data:

(1) Module Size ---------- 72.0 w * 90.0 h mm

(2) Viewing Area ---------- 66.4 w * 39.4 h mm

(3) Dot Size ---------- 0.45 w * 0.53 h mm

(4) Number of Dots ---------- 128 * 64 Dots

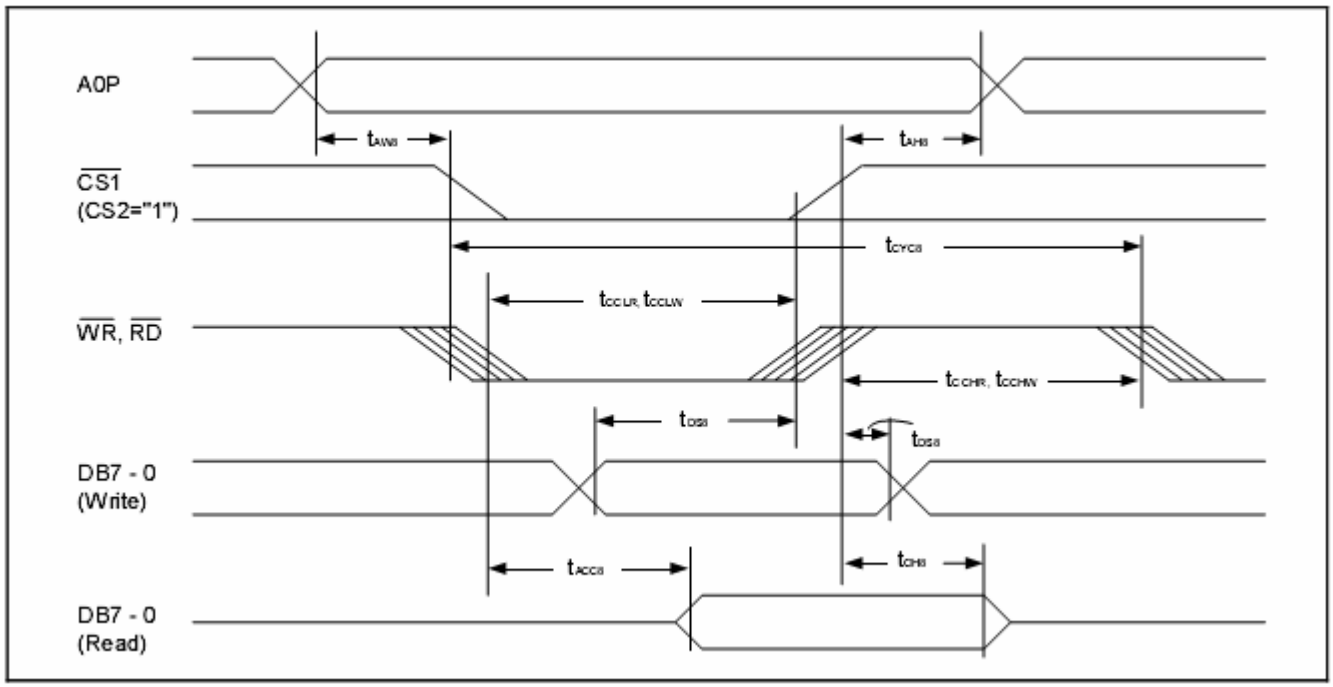
(5) Outline Dimensions---------- See Attached Drawing

4. Pin Connections:

Pin No.	Symbol	LEVEL	Function
1	P/S	INPUT	This is the parallel data input/serial data input switch terminal
2	C86	INPUT	This is the MPU interface switch terminal
3-7	V5-V1	INPUT	This is a multi-level power supply for the liquid crystal drive VDD≥V1≥V2≥V3≥V4≥V5
8	CAP2+	OUTPUT	DC/DC voltage converter capacitor 2 positive connection
9	CAP2-	OUTPUT	DC/DC voltage converter capacitor 2 negative connection
10	CAP1-	OUTPUT	DC/DC voltage converter capacitor 1 negative connection
11	CAP1+	OUTPUT	DC/DC voltage converter capacitor 1 positive connection
12	CAP3-	OUTPUT	DC/DC voltage converter capacitor 3 negative connection
13	VOUT	OUTPUT	DC/DC converter output
14	VSS	0V(GND)	Groud
15	VDD	+5V	Power supply for logic
16-23	D7-D0	H/L	Data bit
24	/RD(E)	H/L	Signal to select read and write
25	/WR(R/W)	H/L	Signal to select read and write
26	A0	H/L	Control/data select signal
27	/RES	H,H-L	Reset signal
28	/CS1	H/L	Chip select signal

5.Timing Characteristics:

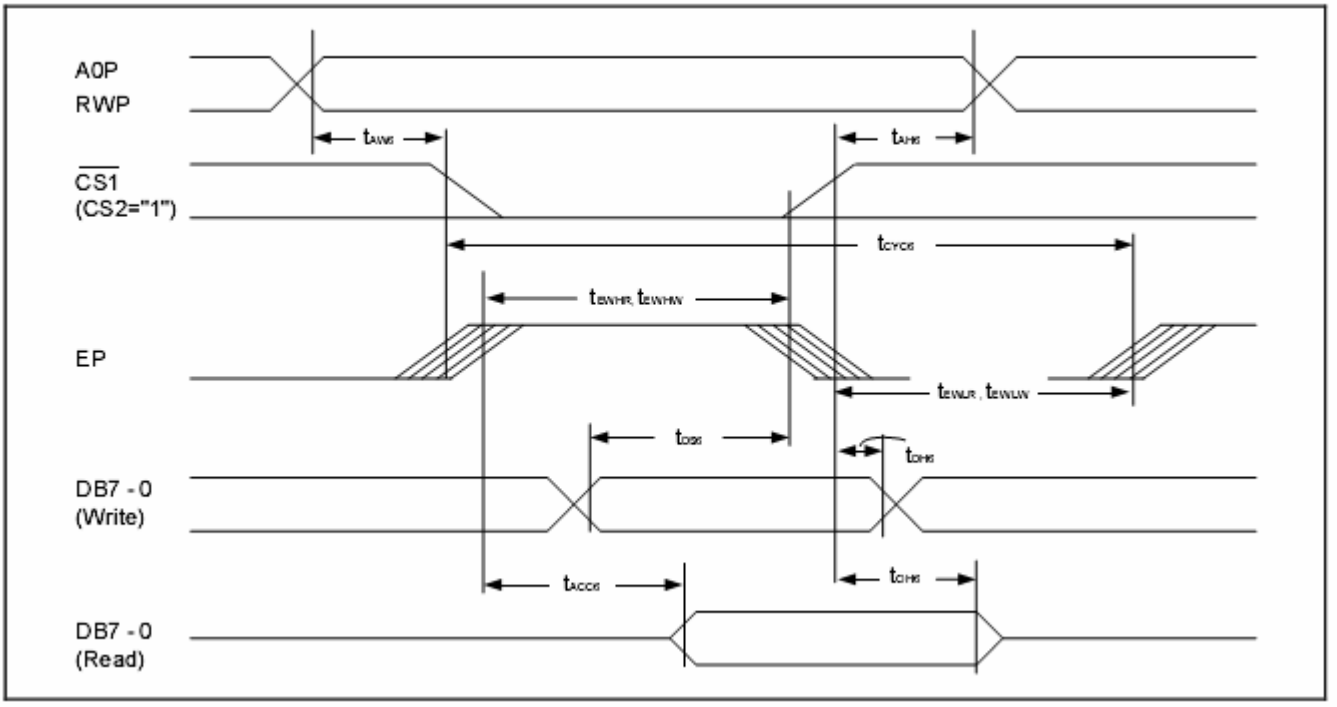
8.6.1. System bus read/write characteristics 1 (For the 8080 Series MPU)



(VDD = 2.7V to 4.5V, T_A = 25℃)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0P	t_{AH8}		0	-	ns
Address setup time		t_{AW8}		0	-	ns
System cycle time	A0P	t_{CYC8}		300	-	ns
Control L pulse width ($\overline{WR}$)	$\overline{WR}$	t_{CCLW}		60	-	ns
Control L pulse width ($\overline{RD}$)	$\overline{RD}$	t_{CCLR}		120	-	ns
Control H pulse width ($\overline{WR}$)	$\overline{WR}$	t_{CCHW}		60	-	ns
Control H pulse width ($\overline{RD}$)	$\overline{RD}$	t_{CCHR}		60	-	ns
Data setup time	DB7 - 0	t_{DS8}		40	-	ns
Address hold time		t_{DH8}		15	-	ns
$\overline{RD}$ access time		t_{ACC8}	C_L = 100pF	-	140	ns
Output disable time		t_{OH8}		10	100	ns

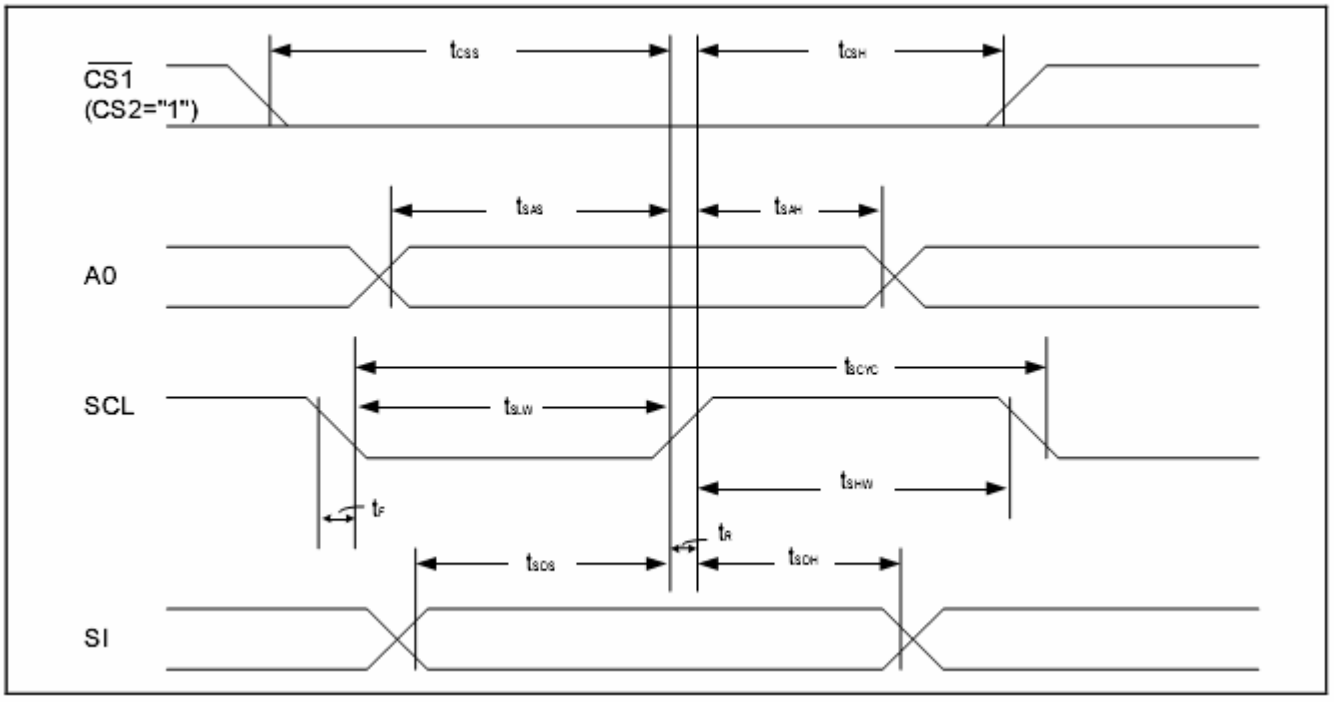
8.6.2. System bus read/write characteristics 2 (6800 series MPU)



(VDD = 2.7V to 4.5V, T_A = 25°C)

Item		Signal	Symbol	Condition	Rating		Units
					Min.	Max.	
Address hold time		A0P	t_{AH6}		0	-	ns
Address setup time			t_{AW6}		0	-	ns
System cycle time		A0P	t_{CYC6}		300	-	ns
Data setup time		DB7 - 0	t_{DS6}	C_L = 100pF	40	-	ns
Data hold time			t_{DH6}		15	-	ns
Access time			t_{ACC6}		-	140	ns
Output disable time			t_{OH6}		10	100	ns
Enable H pulse time	Read	EP	t_{EWHR}		120	-	ns
	Write		t_{EWHW}		60	-	ns
Enable L pulse time	Read	EP	t_{EWLR}		60	-	ns
	Write		t_{EWLW}		60	-	ns

8.6.3. The serial interface



(VDD = 2.7V to 4.5V, T_A = 25℃)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Serial Clock Period	SCL	t_{SCYC}	-	250	-	ns
SCL 'H' pulse width		t_{SHW}	-	100	-	ns
SCL 'L' pulse width		t_{SLW}	-	100	-	ns
Address setup time	A0P	t_{SAS}	-	150	-	ns
Address hold time		t_{SAH}	-	150	-	ns
Data setup time	SI	t_{SDS}	-	100	-	ns
Data hold time		t_{SDH}	-	100	-	ns
CS-SCL time	CS	t_{CSS}	-	150	-	ns
		t_{CSH}	-	150	-	ns

2.The Characteristics and The Reliability Test

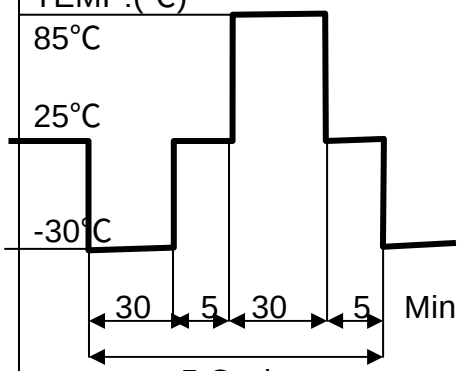
1.Electro-Optic Characteristics:

Condition:TEMP=(23±3)℃ Hum=(70±5)%RH

V_{dd}: 5.0V

NO	Item		Symbol	Min	Typ.	Max	Unit	Condition
1	Supply Voltage(Logic)		Vdd-Vss	3.0	3.3	3.6	V	
2	LCD Operating Voltage		Vdd-V_0		10.1		V	-20℃
					9.7		V	25℃
					9.3		V	70℃
3	Response Time		Ton		60		ms	
			Toff		316		ms	
4	Contrast		CR	3				
5	Viewing Angel	12H	θ1		45		Deg.	(CR≥3.0)
		6H	θ2		55			
		3H	θ3		50			
		9H	θ4		50			
6	LCD Threshold Voltage		Vth		7.78		V	25℃

3.Reliability Test

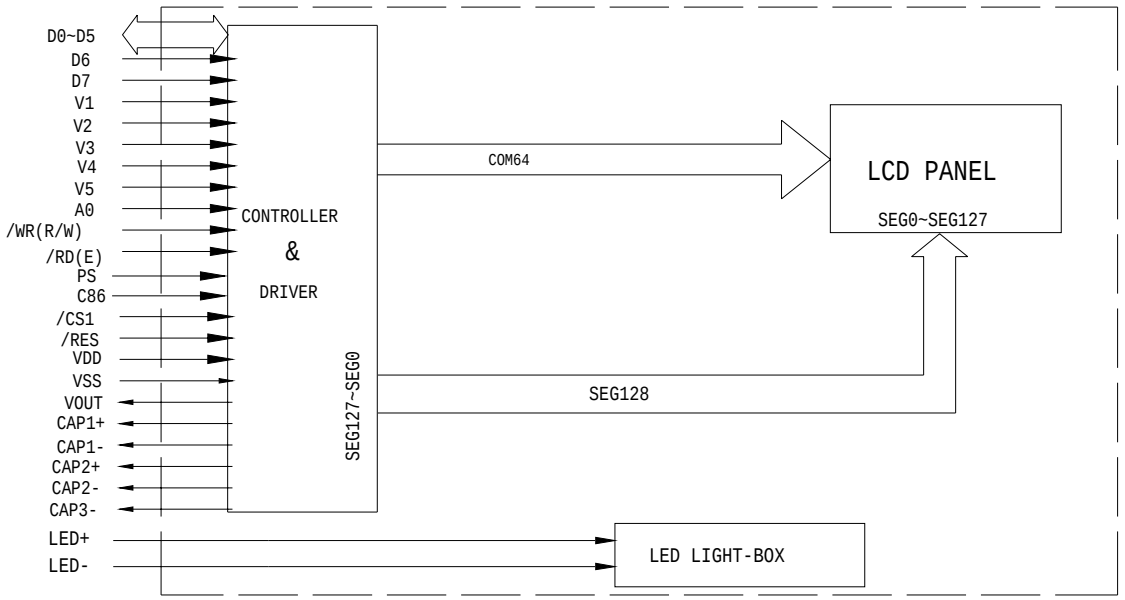
No	Items	Test Condition	Equipment	Test Result
1	High TEMP Storage	TEMP: 85±2℃ Time: 96h Restore:24h	Tenny	Passed
2	Low TEMP Storage	TEMP: -30±3℃ Time: 96h Restore:24h	Tenny	Passed
3	High TEMP Operating	TEMP:70±2℃ Vop: 5V Timp: 24h Restore:24h	Tenny	Passed
4	Low TEMP Operating	TEMP:-20±2℃ Vop: 5V Timp: 24h Restore:24h	Tenny	Passed
5	High TEMP High Hum Storage	TEMP:40±2℃ Hum: 95%Rh Time: 96h Restore:24h	Tenny	Passed
6	Thermal Shock	TEMP:(℃)  5 Cycles Restore:24h	Tenny	Passed

4.Instruction Sets

Command	Command Code											Function
	A0P	$\overline{RD}$	$\overline{WR}$	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	
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	0	1	0	0	0	0	1	Most significant column address				Sets the most significant 4 bits of the display RAM column address.
Column address set lower bit	0	1	0	0	0	0	0	Least significant column address				Set 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 driver voltage bias ratio SPLC501C.....0:1/9, 1:1/7
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). V_5 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	0	1	0	1	0	0	0	0	0	0	1	Set the V_5 output voltage electronic volume register
Electronic volume register set	0	1	0	*	*	Electronic volume value						

Command	Command Code											Function
	A0P	$\overline{RD}$	$\overline{WR}$	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	
19). Static indicator				1	0	1	0	1	1	0	0	0: OFF, 1: ON
ON/OFF											1	
Static indicator				*	*	*	*	*	*	Mode		Set the flashing mode
Register set												
20). Page Blink	0	1	0	1	1	0	1	0	1	0	1	
Page selection	0	1	0	P7	P6	P5	P4	P3	P2	P1	P0	P7 - 0: 1 - blinking page 0 - no blinking, normal display
21). Driving Mode Set	0	1	0	1	1	0	1	0	0	1	0	Set the driving mode register
Mode selection	0	1	0	D1	D0	0	0	0	0	0	0	Driving capability (D1, D0): (1,1)>(0,0)>(0,1)>(1,0)
22). Power saver												Display OFF and display all points ON compound command
23). NOP	0	1	0	1	1	1	0	0	0	1	1	Command for non-operation
24). Test	0	1	0	1	1	1	1	*	*	*	*	Command for IC test. Do not use
				1	1	0	1	0	1	0	0	this command

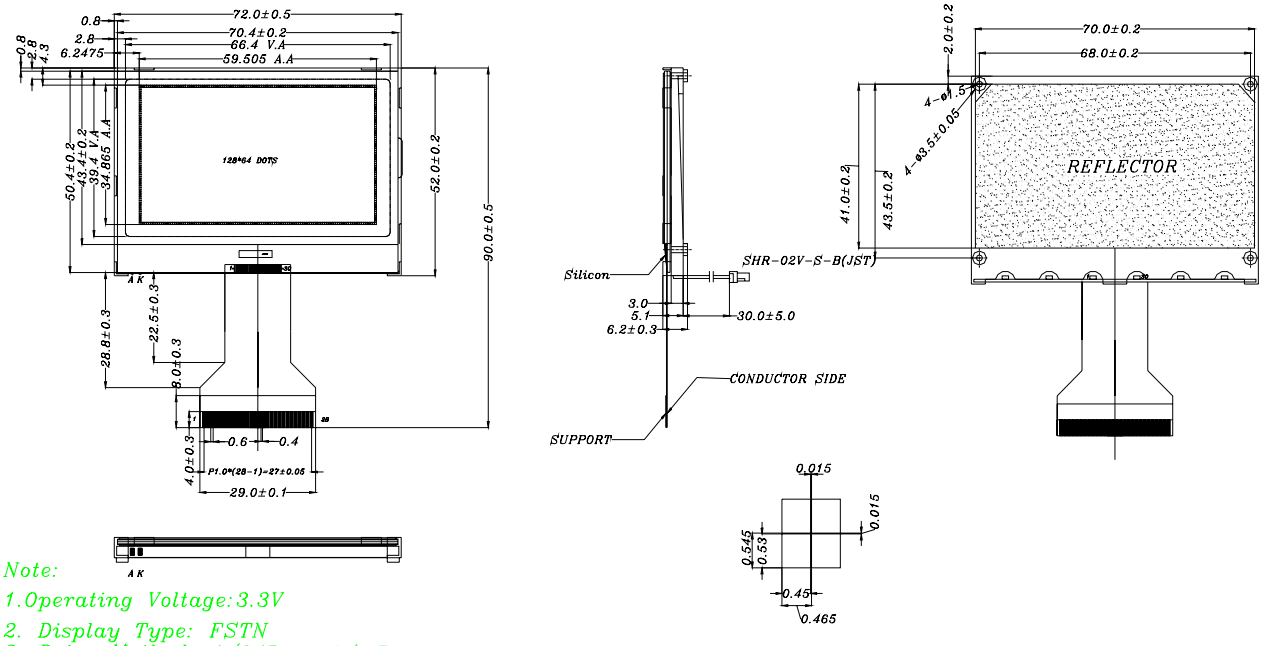
5. Block Diagram



PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
COM	P/S	C86	V5	V4	V3	V2	V1	CAP2+	CAP2-	CAP1-	CAP1+	CAP3-	VOUT	VSS

PIN	15	16	17	18	19	20	21	22	23	24	25	26	27	28
COM	VDD	D7(SI)	D6(SCL)	D5	D4	D3	D2	D1	D0	RD(E)	WR(R/W)	A0	/RES	/CS1

6. Mechanical Outline



Note:

1. Operating Voltage: 3.3V
2. Display Type: FSTN
3. Drive Method: 1/64Duty, 1/9 Bias
4. Viewing Direction: 6:00
5. Operating Temp: −20°C~70°C
   Storage Temp: −30°C~85°C
6. Backlight: LED/BLUE
7. Resolution: 128X64 Dots