AZ DISPLAYS,INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY

PART NUMBER: AGM1264N-FLW-FBS-02

DATE: MARCH 12, 2008

1. General Specifications

1. Features
   - A. Drive Method:1/65 Duty, 1/9 Bias
   - B. The Module Operating Voltage: 3.0V;
   - C. The LCD Operating Voltage : 8.3V;
   - D. Viewing Direction: 6:00h
   - E. Operating Temperature: 0℃~50℃
   - F. Storage Temperature: -20℃~70℃
   - G. Display mode: FSTN mode, positive type display

2.Mechanical Data:

(1) Module Size ----------------------- 70.2w * 43.0 h mm

(2) Viewing Area --------------------- 59.0w *30.5 h mm

(3) Dot Size ---------------------- 0.39w * 0.39 h mm

(4) Dot Quality----------------------- 128 * 64

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

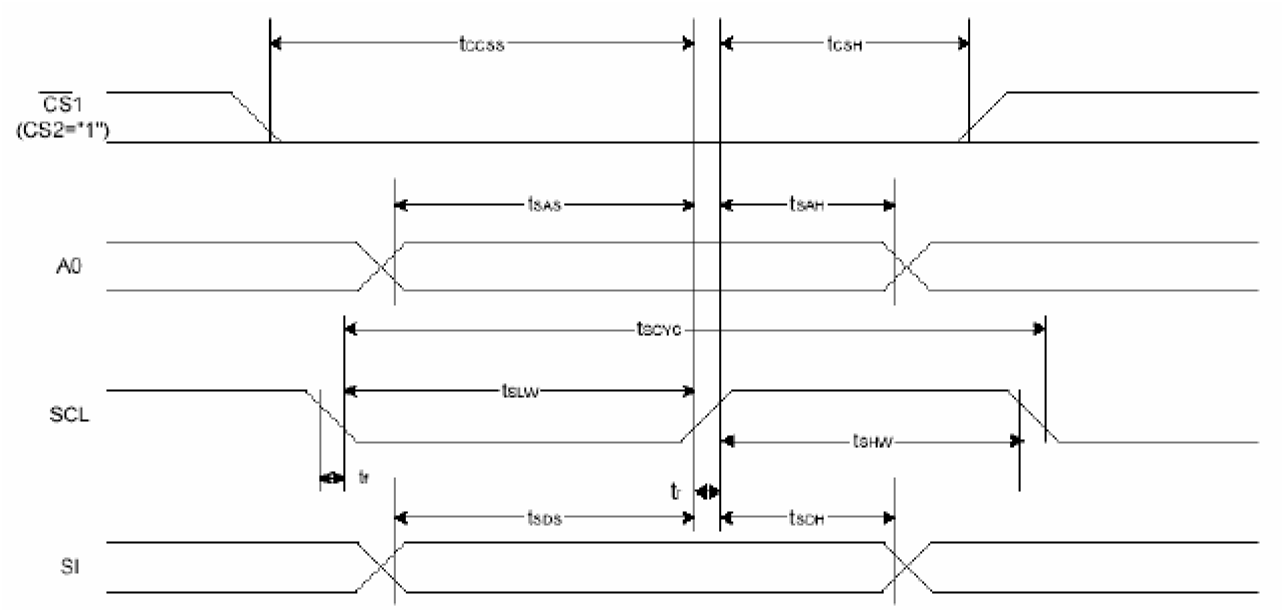
3.Pin Connections:

Pin No.	Symbol	Function
1	NC	No connect
2-6	V0- V4	LCD driver supply voltages.
7	C2-	Connection Pin for Voltage Converter
8	C2+	
9	C1+	
10	C1-	
11	C3+	
12	VOUT	Connect a capacitor between this terminal and VSS
13	VSS	Ground(0v)
14	VDD	Logic Supply Voltage(+3.0V)
15	SI	Serial data input
16	SCL	Serial clock input
17	RS	This is connected to the least significant bit of the normal MPU address bus,and it determines whether the data bits are data or a command.
18	/RES	Reset Signal
19	/CS1	Chip Select signal.
20	NC	No connect

4. Absolute Maximum Ratings

Parameter	Symbol	Conditions	Unit
Power Supply Voltage	V_{DD}	-0.3 ~ 3.6	V
Power supply voltage (VDD standard)	VDD2	-0.3 ~ 3.6	V
Power supply voltage (VDD standard)	V_0, V_{OUT}	-0.3 ~ 13.5	V
Power supply voltage (VDD standard)	V_1, V_2, V_3, V_4	-0.3 to V_0	V

5. The 4-line SPI Interface



(VDD = 3.3V,Ta = –30 to 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
4-line SPI 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	—	

6.Instruction Table

Table 16: Table of ST7565R Commands (Note) *: ignored data

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	1	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 (ST7565R)
(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_0 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 V_0 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 save	0	1	0									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

2.The Characteristics and The Reliability Test

1.Electro-Optic Characteristics:

Condition:TEMP=(23±3)℃ Hum=(70±5)%RH

NO	Item		Symbol	Min	Typ.	Max	Unit	Condition
1	Supply Voltage(Logic)		Vdd-Vss		3.0		V	
2	LCD Operating Voltage		Vdd-V_0		8.5		V	0℃
					8.3			25℃
					8.1			50℃
3	Response Time		Ton		116		ms	
			Toff		304		ms	
4	Contrast		CR	2				
5	Viewing Angel	12H	θ 1		45		Deg.	(CR≥3.0)
		6H	θ 2		57			
		3H	θ 3		50			
		9H	θ 4		50			
6	LCD Threshold Voltage		Vth		6.67		V	25℃

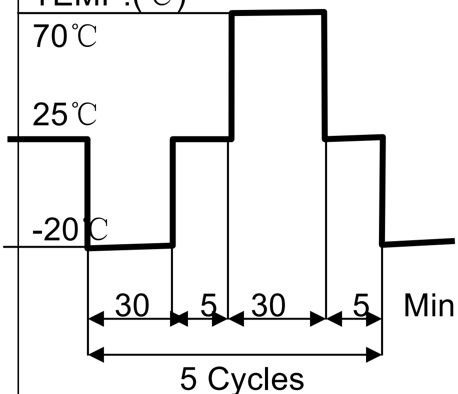
2. Characteristics of backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	VF		4.5		V	
Forward Current	IF		30	40	mA	
Reverse Voltage	VR		5.0		V	
Reverse Current	IR		0.2		mA	
Power Dissipation	PD		0.135		W	VF=4.5V
Luminous	LV	40	50		cd/m^2	VF=4.5V
Color	WHITE					

WARNING:

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

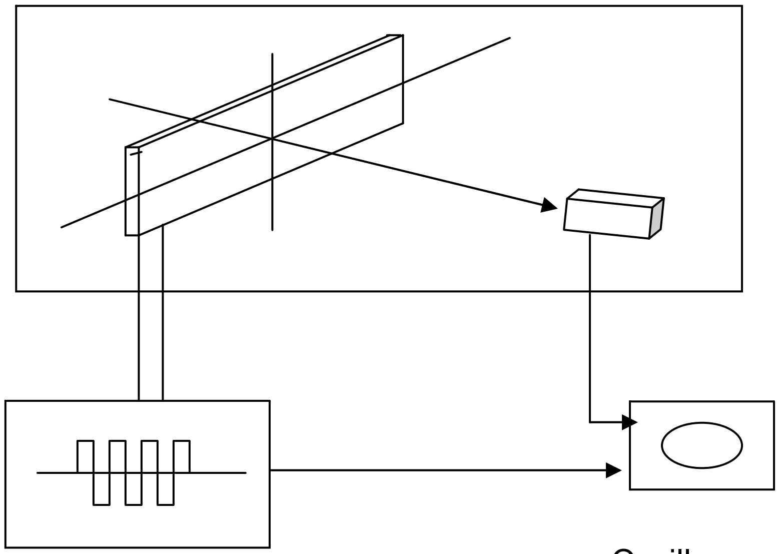
3.Reliability Test

No	Items	Test Condition	Equipment	Test Result
1	High TEMP Storage	TEMP: 70±2℃ Time: 96h Restore:24h	Tenny	Passed
2	Low TEMP Storage	TEMP: -20±3℃ Time: 96h Restore:24h	Tenny	Passed
3	High TEMP Operating	TEMP:50±2℃ Vop: 3V Timp: 24h Restore:24h	Tenny	Passed
4	Low TEMP Operating	TEMP:0±2℃ Vop: 3V 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:(℃)  Restore:24h	Tenny	Passed

3.The LCD Measuring Method and Equipment

1. Threshold Voltage and Response Time Measuring

(1) Equipment



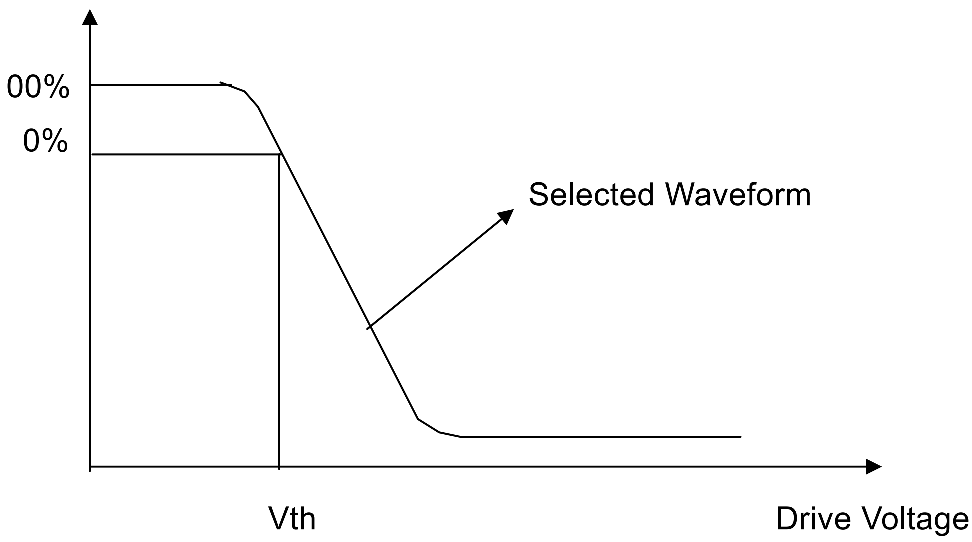
Oscilloscope

aveform Generator

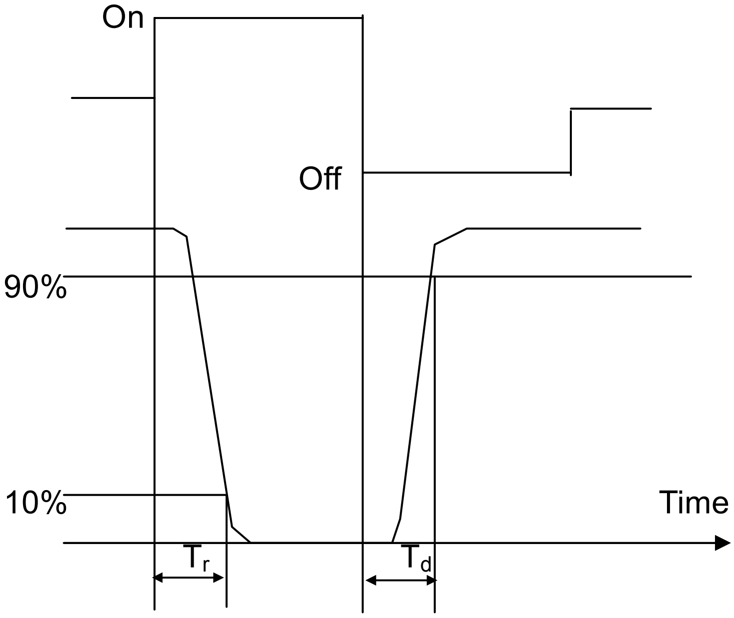
(2) Definition

. Threshold Voltage (Vth)

rightness

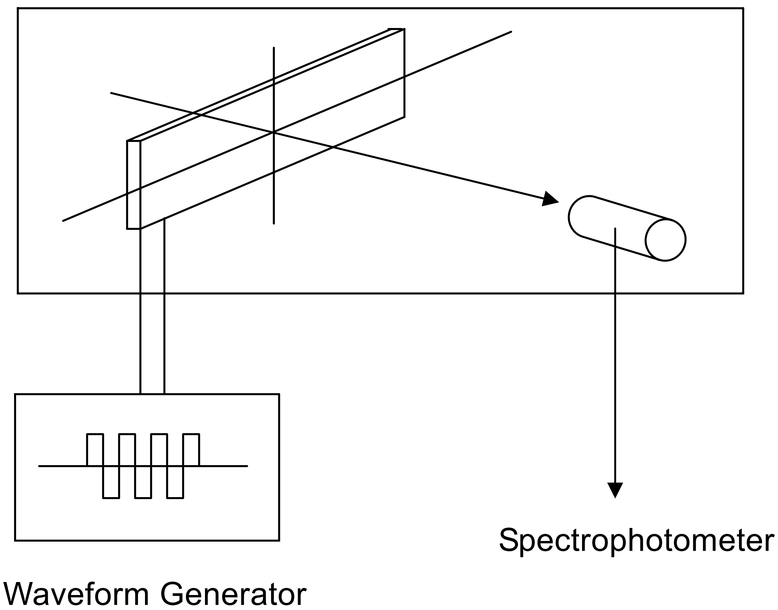


B. Response Time



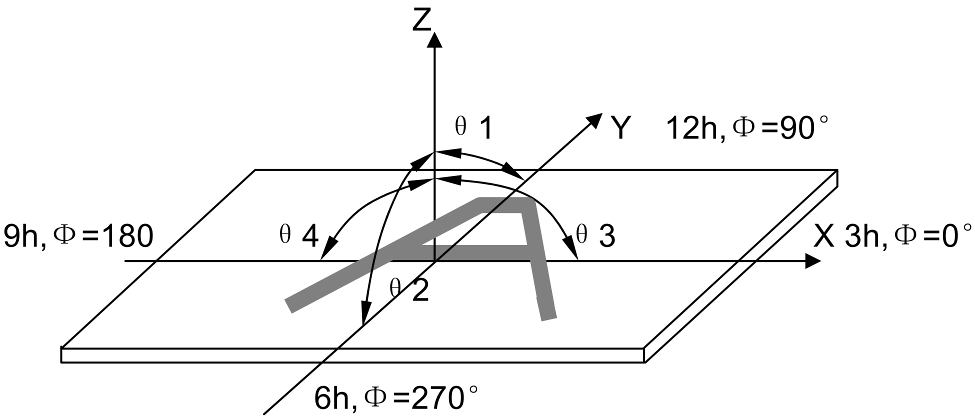
2. Contrast Measuring

(1) Equipment



(2)Definition:

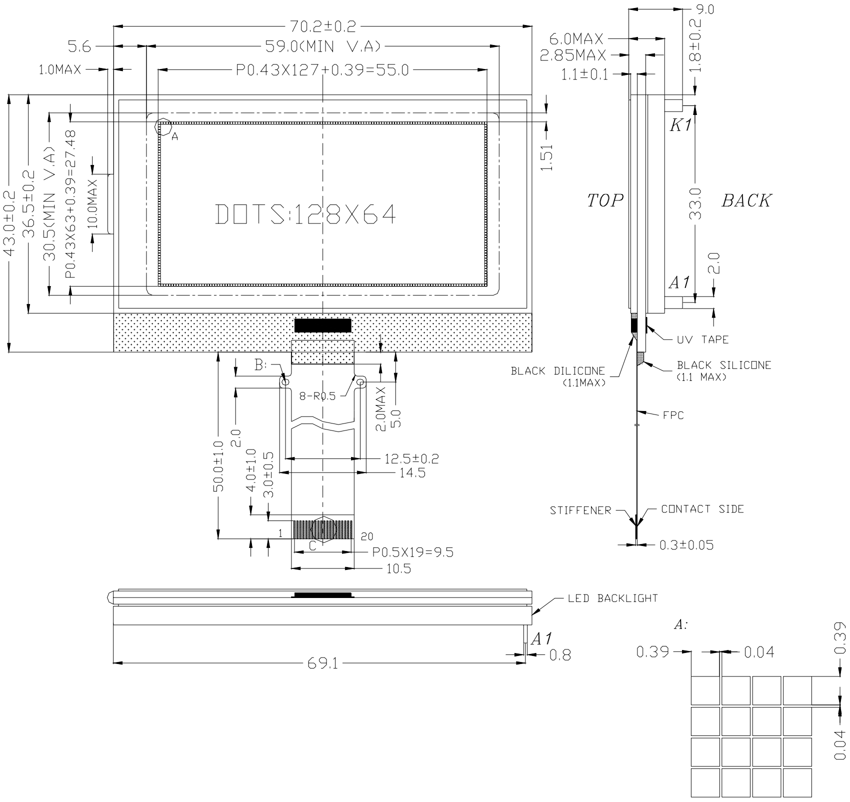
A.Viewing Angle:



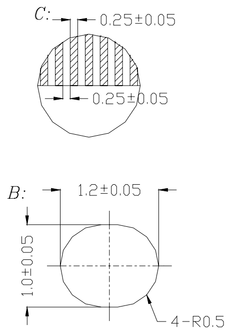
B. Contrast Ratio (Positive)

$$CR = \frac{\text{Brightness of non-selected wave-form}}{\text{Brightness of selected wave-form}}$$

5.Attached Drawing



PIN	SYMBOL	PIN	SYMBOL
1	NC	11	C3+
2	V0	12	VOUT
3	V1	13	VSS
4	V2	14	VDD
5	V3	15	SI
6	V4	16	SCL
7	C2-	17	RS
8	C2+	18	/RES
9	C1+	19	/CS1
10	C1-	20	NC



Note:

1. *Display Type: FSTN*
2. *Polarizer Mode: Transflective/Positive*
3. *Drive Method: 1/65Duty, 1/9 Bias*
4. *Viewing Direction: 6:00*
5. *Operating Temp: 0°C~50°C*
   Storage Temp: -20°C~70°C
6. *Controller: ST7565R*
7. *Resolution: 128X64 Dots*
8. *Logic Voltage: 3.0V*
   LCD Operating Voltage: 8.3V
9. *Backlight: LED White ;VOLTAGE: 4.5V*
10. *Unmarked Tolerances: ±0.3*