

AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER

AGM 1264F SERIES

REVISED:

December 10, 2001

AGM1264F SERIES GRAPHIC MODULE

1.0 MECHANICAL SPECS

2. Overall Module Size	93.0mm(W) x 70.0mm(H) x max 14.0mm(D) for LED backlight version 93.0mm(W) x 70.0mm(H) x max 9.5mm(D) for reflective version
3. Dot Size	0.48mm(W) x 0.48mm(H)
4. Dot Pitch	0.52mm(W) x 0.52mm(H)
5. Duty	1/64
6. Controller IC	KS0108B
7. LC Fluid Options	STN, FSTN
8. Polarizer Options	Reflective, Transflective, Transmissive
9. Backlight Options	LED
10. Temperature Range Options	Standard (0°C ~ 50°C), Wide (-20°C ~ 70°C)

2.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating temperature (Standard)	Top	0	-	50	°C
Storage temperature (Standard)	Tst	-20	-	70	°C
Operating temperature (Wide temperature)	Top	-20	-	70	°C
Storage temperature (Wide temperature)	Tst	-30	-	80	°C
Input voltage	Vin	Vss		Vdd	V
Supply voltage for logic	Vdd- Vss	-0.3	-	7.0	V
Supply voltage for LCD drive	Vdd- Vo	9.5	11.5	14.0	V

AGM1264F SERIES GRAPHIC MODULE

3.0 ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Input voltage (high)	Vih	H level	3.5	-	Vdd	V
Input voltage (low)	Vil	L level	0	-	1.5	V
Recommended LC Driving Voltage (Standard Temp)	Vdd - Vo	0°C	-	12.2	12.8	V
		25°C	-	11.5	-	
		50°C	10.2	10.6	-	
Recommended LC Driving Voltage (Wide Temp)	Vdd -Vo	-20°C	-	13.0	14.0	V
		0°C	-	12.2	-	
		50°C	10.2	10.6	-	
		70°C	9.5	10.0	-	
Power Supply Current	Idd	Vdd=5.0V	-	-	15.0	mA
LED Power Supply Voltage	Vfled	R=6.8Ω	-	4.6	5.0	V
LED Power Supply Current	Ifled	R=6.8Ω	-	470	560	mA

AGM1264F SERIES GRAPHIC MODULE

4.0 OPTICAL CHARACTERISTICS

Mode \ Item		Cr (Contrast Ratio)		θ (Viewing Angle)		ϕ (Viewing Angle)	
		25°C		25°C		25°C	
		MIN.	TYP.	MIN	TYP.	MIN	TYP.
R	A	2.8	3.05	80	85	-	35
	B	7.10	7.70	80	85	-	35
	C	-	-	-	-	-	-
S	A	2.49	2.99	80	85	-	35
	B	7.05	7.55	80	85	-	35
	C	-	-	-	-	-	-

Note:

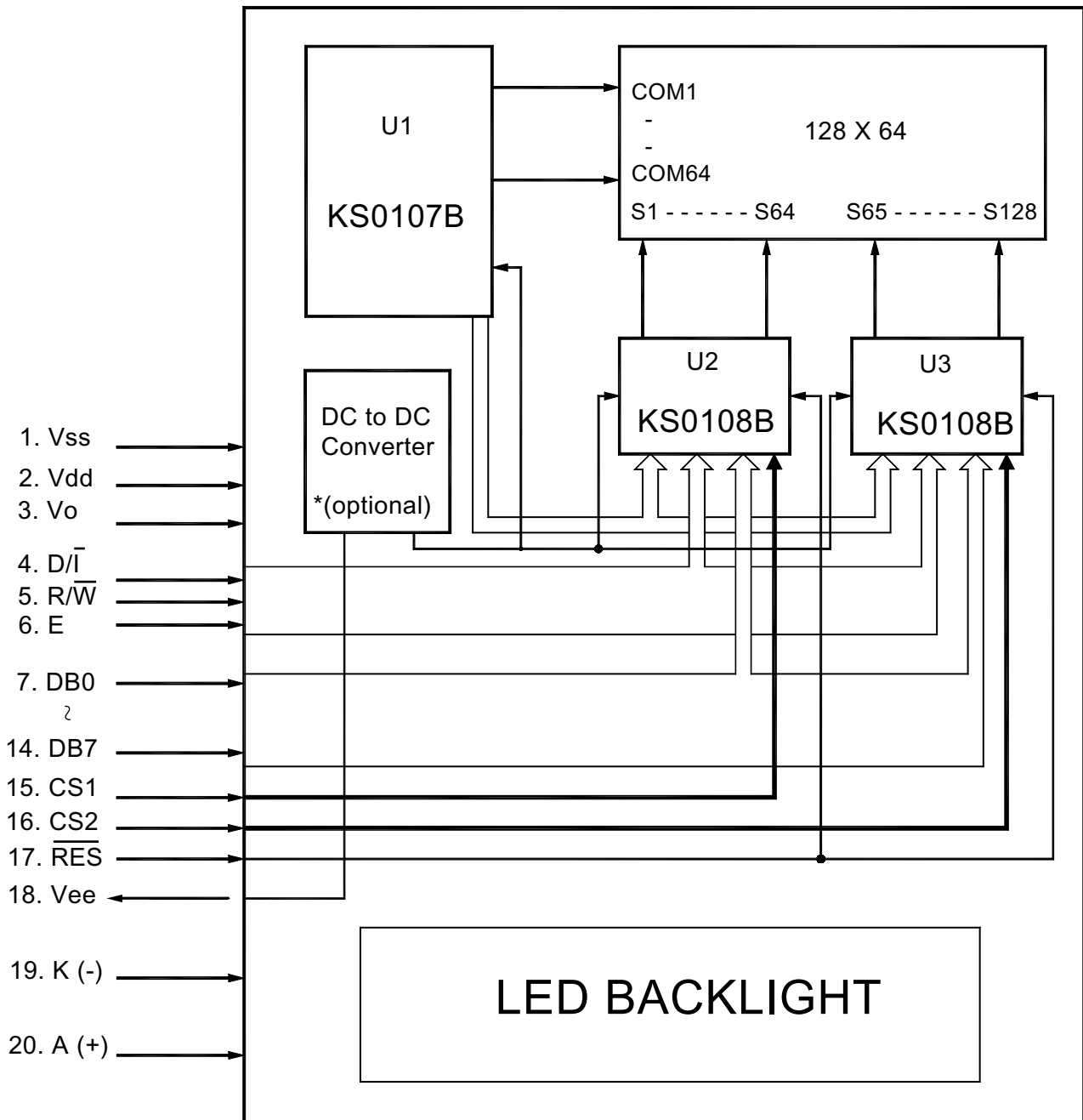
R: Reflective
 S: Transflective
 A: STN Gray
 B: STN Yellow
 C: FSTN

At: $\phi=0^\circ, \theta=0^\circ$

Item	Symbol	Condition	Min	Typ	Max	Unit
Response time (rise)	Tr	25°C	-	140	280	ms
Response time (fall)	Tf	25°C	-	80	160	ms

AGM1264F SERIES GRAPHIC MODULE

5.0 BLOCK DIAGRAM

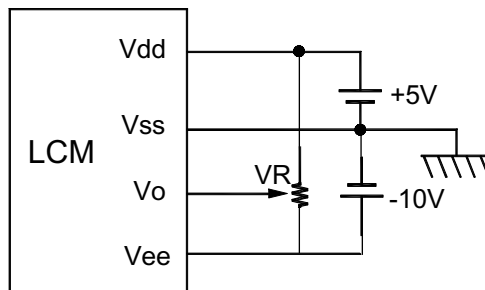


AGM1264F SERIES GRAPHIC MODULE

6.0 PIN ASSIGNMENT

Pin No.	Symbol	Function	Level
1	Vss	Ground	-
2	Vdd	+5V	-
3	Vo	LCD contrast adjust	-
4	D/I	H: Data input L: Instruction code input	H/L
5	R/W	H: Data read L: Data write	H/L
6	E	Enable signal	H/L
7	DB0	Data bit 0	H/L
8	DB1	Data bit 1	H/L
9	DB2	Data bit 2	H/L
10	DB3	Data bit 3	H/L
11	DB4	Data bit 4	H/L
12	DB5	Data bit 5	H/L
13	DB6	Data bit 6	H/L
14	DB7	Data bit 7	H/L
15	CS1	Chip selection for IC1	H
16	CS2	Chip selection for IC2	H
17	RST	Reset	L
18	Vee	Power supply for LCD driving	-
19	BL-	Power Supply for BL-	-
20	BL+	Power Supply for BL+	-

7.0 POWER SUPPLY



VR=10K~20K

AGM1264F SERIES GRAPHIC MODULE

8.0 TIMING CHARACTERISTICS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Enable cycle time	t_{CYC}	Fig. a, Fig. b	1000	-	-	ns
E high level width	t_{WH}	Fig. a, Fig. b	450	-	-	ns
E low level width	t_{WL}	Fig. a, Fig. b	450	-	-	ns
Enable rise/fall time	T_r, t_f	Fig. a, Fig. b	-	-	25	ns
Address set up time	t_{AS}	Fig. a, Fig. b	140	-	-	ns
Address hold time	t_{AH}	Fig. a, Fig. b	10	-	-	ns
Data delay time	t_{DDR}	Fig. b	-	-	320	ns
Data set up time	t_{DSW}	Fig. a	200	-	-	ns
Data hold time (Write)	t_{DHW}	Fig. a	10	-	-	ns
Data hold time (Read)	t_{DHR}	Fig. b	20	-	-	ns

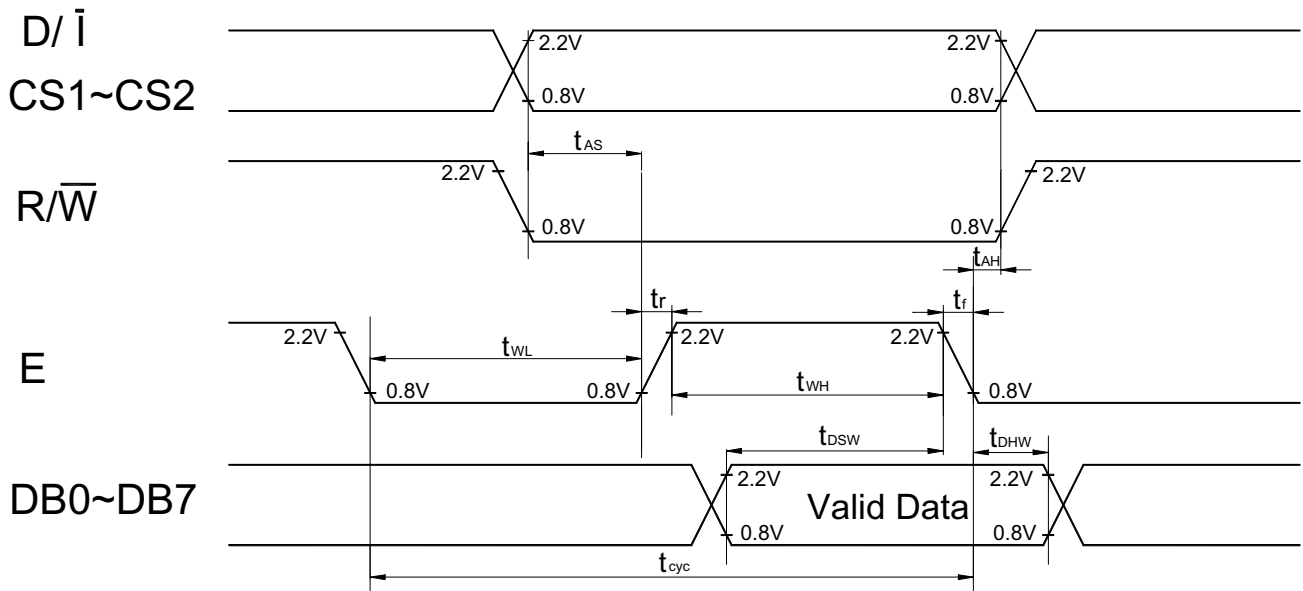
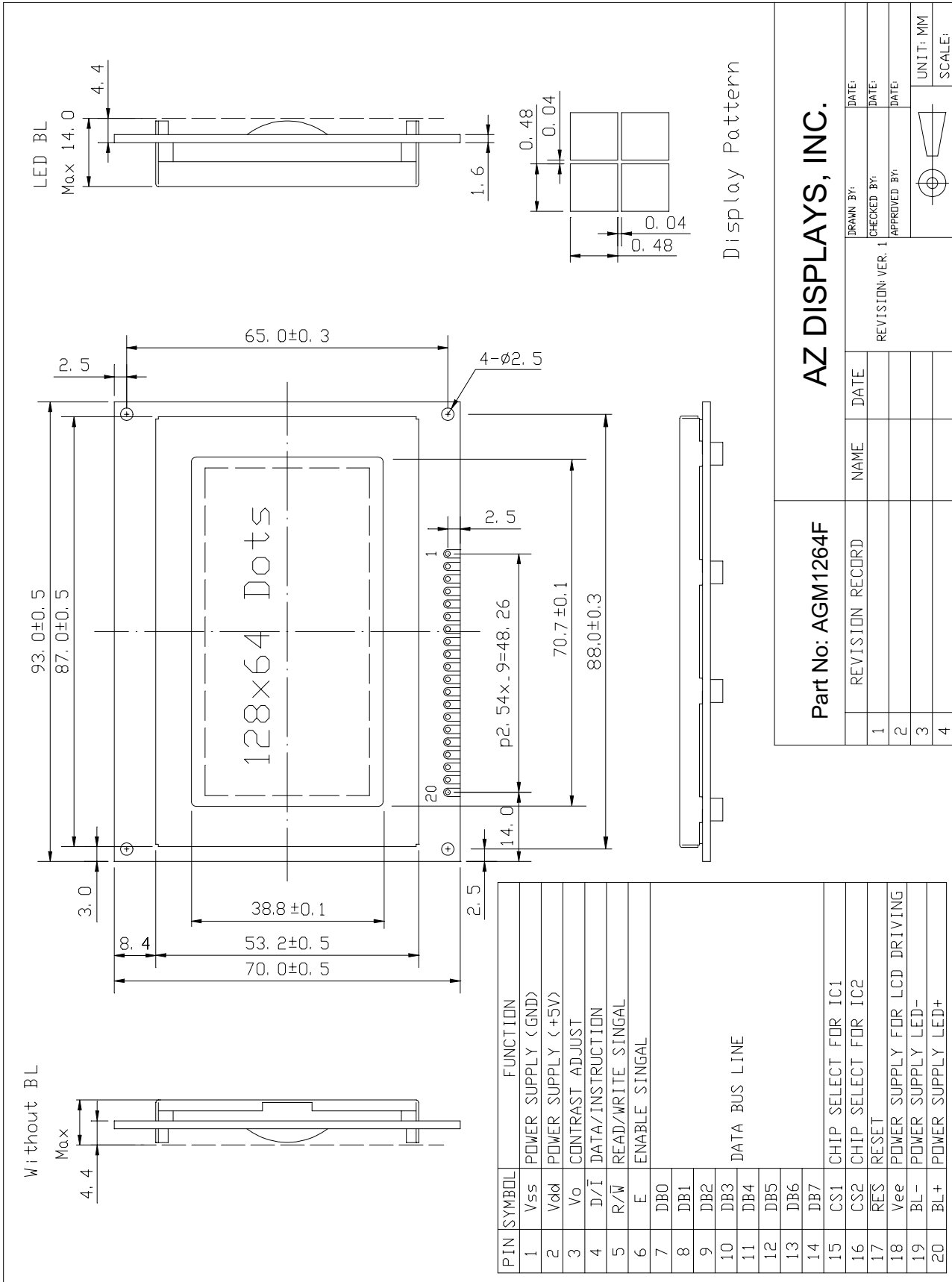


Fig. a Interface timing (data write)

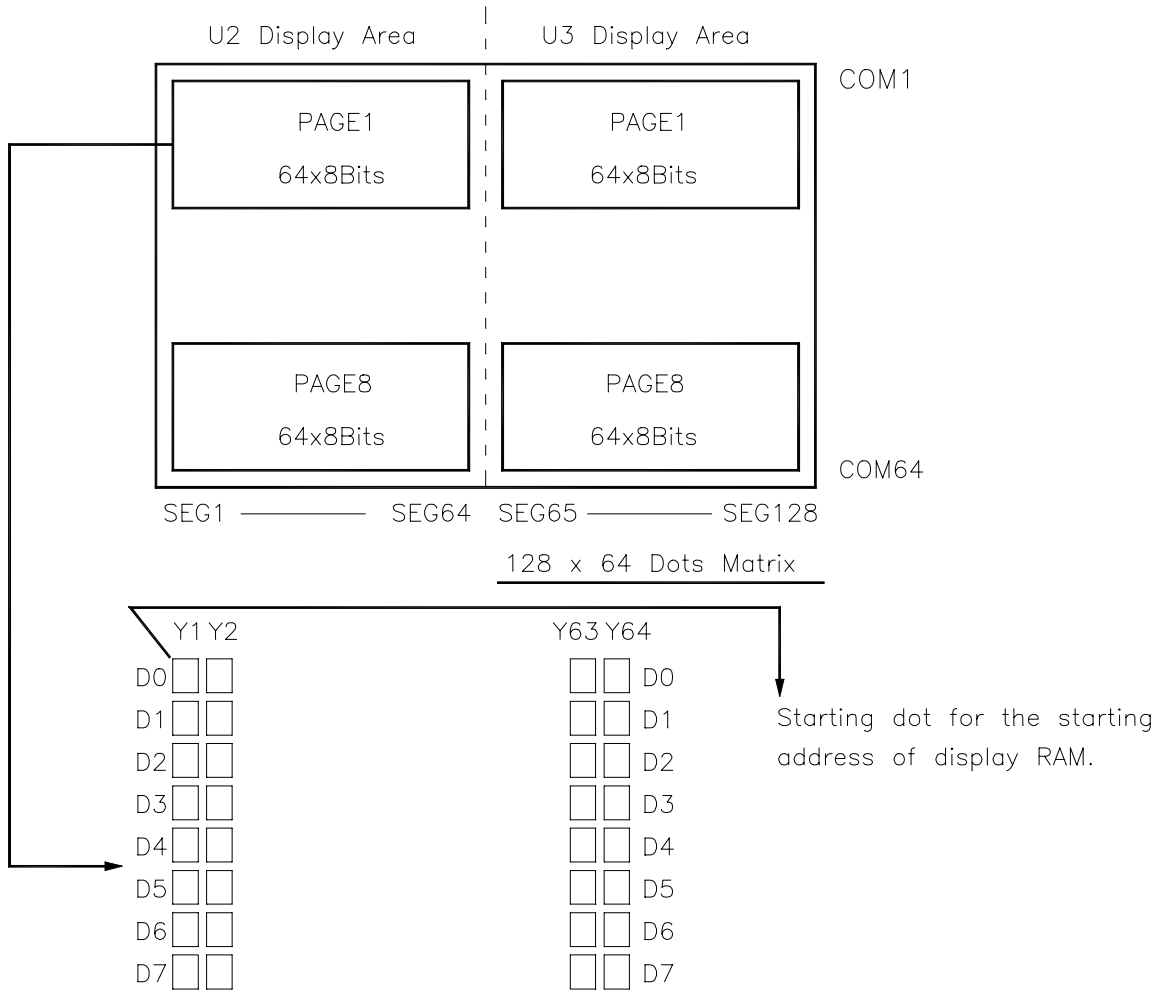
AGM1264F SERIES GRAPHIC MODULE

10.0 MECHANICAL DIAGRAM

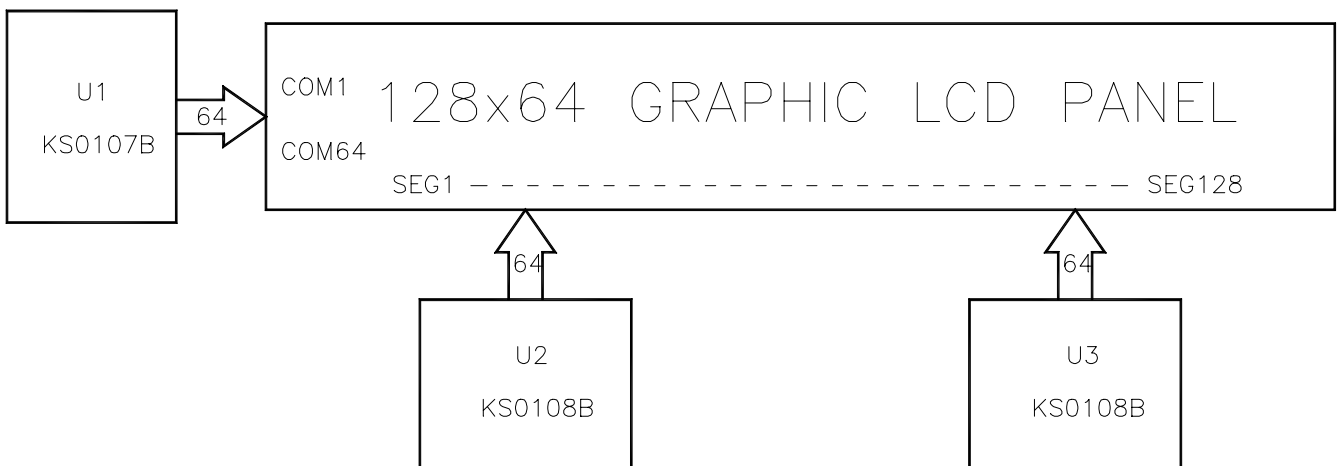


AGM1264F SERIES GRAPHIC MODULE

11.0 RELATION BETWEEN DISPLAY PATTERN AND DRIVERS



Each segment driver has 8 pages RAM, and each page has 64x8 bits RAM.
 D0~D7 are 8 bits transmitted data, where D0 is LSB and D7 is MSB.



AGM1264F SERIES GRAPHIC MODULE

12.0 DISPLAY CONTROL INSTRUCTION

The display control instructions control the internal state of the KS0108B. Instructions are received from MPU to KS0108B for the display control.

INSTRUCTION	D/I	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	DESCRIPTION
Display ON/OFF	0	0	0	0	1	1	1	1	1	1	Controls the display on or off. Display RAM data and internal status is not affected. 0: OFF. 1:ON
Set Address	0	0	0	1	Y address (0~63)					Sets the Y address at the Y address counter.	
Set Page (X address)	0	0	1	0	1	1	1	Page (0~7)			Sets the X address at the X address register.
Display Start Line	0	0	1	1	Display start line (0~63)					Indicates the display data RAM displayed at the top of the screen.	
Status Read	0	1	BUSY	0	ON/OFF	RESET	0	0	0	0	Read status: BUSY 0:Ready 1:In operation ON/OFF 0:Display ON 1:Display OFF RESET 0:Normal 1:Reset
Write Display Data	1	0	Write Data								Writes data DB0~DB7 into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read Display Data	1	1	Read Data								Reads data DB0~DB7 from display data RAM to the data bus.