AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER AGM 1264F SERIES

REVISED: December 10, 2001

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℃ ~ 50℃), Wide (-20℃ ~ 70℃)

2.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating temperature (Standard)	Top	0	-	50	℃
Storage temperature (Standard)	Tst	-20	-	70	℃
Operating temperature (Wide temperature)	Top	-20	-	70	℃
Storage temperature (Wide temperature)	Tst	-30	-	80	℃
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

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℃	-	12.2	12.8	V
		25℃	-	11.5	-	
		50℃	10.2	10.6	-	
Recommended LC Driving Voltage (Wide Temp)	Vdd -Vo	-20℃	-	13.0	14.0	V
		0℃	-	12.2	-	
		50℃	10.2	10.6	-	
		70℃	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

4.0 OPTICAL CHARACTERISTICS

Mode \ Item		Cr (Contrast Ratio)		θ (Viewing Angle)		ϕ (Viewing Angle)	
		25℃		25℃		25℃	
		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	-	-	-	-	-	-

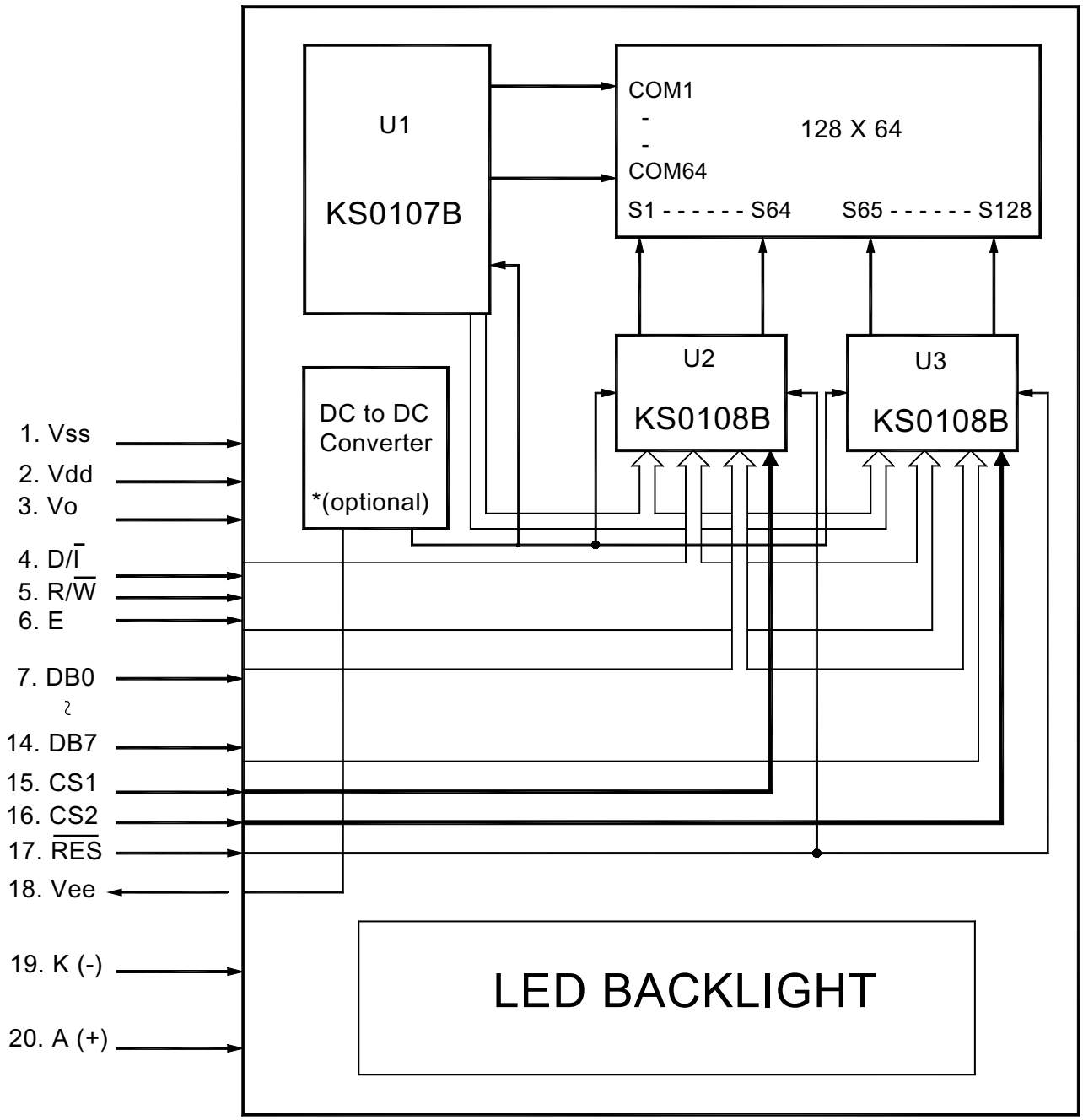
Note:

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

At: ϕ=0°, θ=0°

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

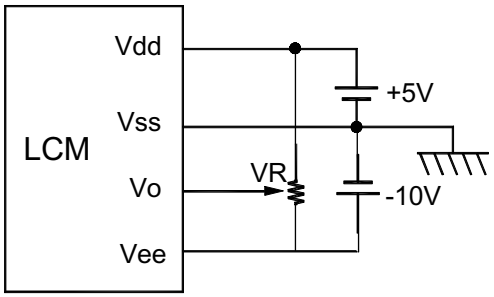
5.0 BLOCK DIAGRAM



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

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

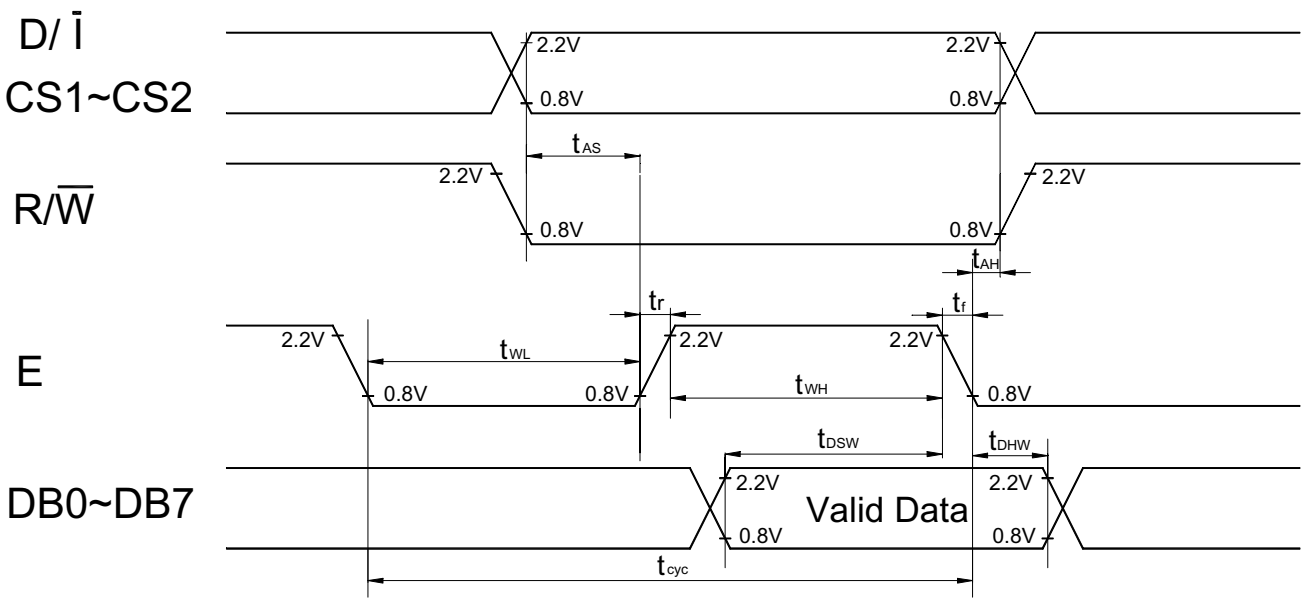


Fig. a Interface timing (data write)

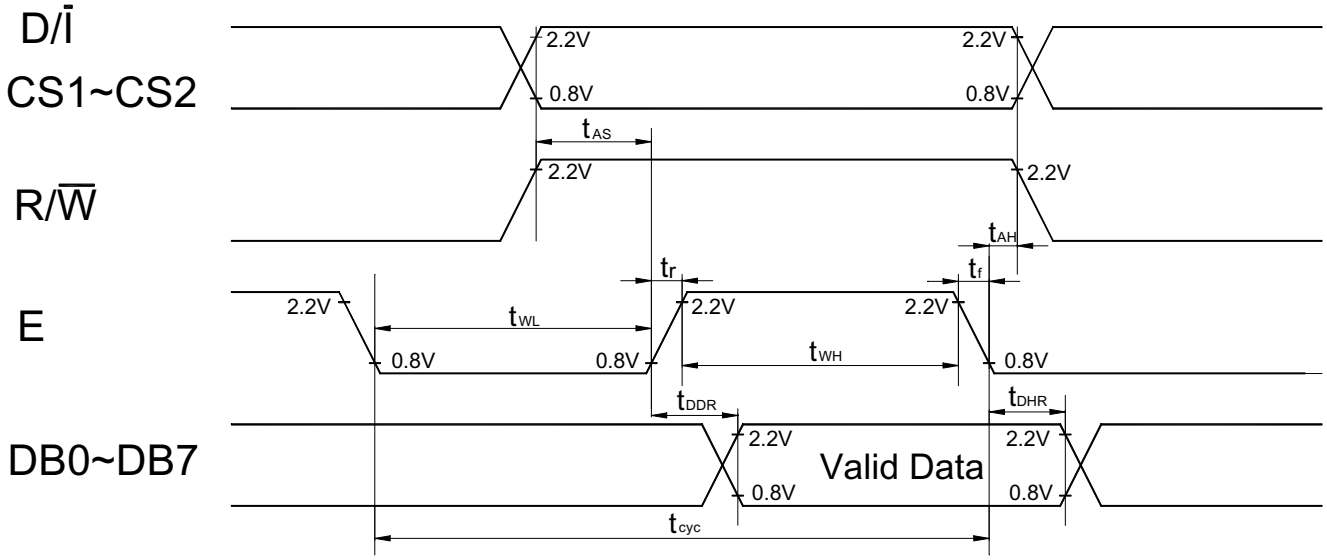


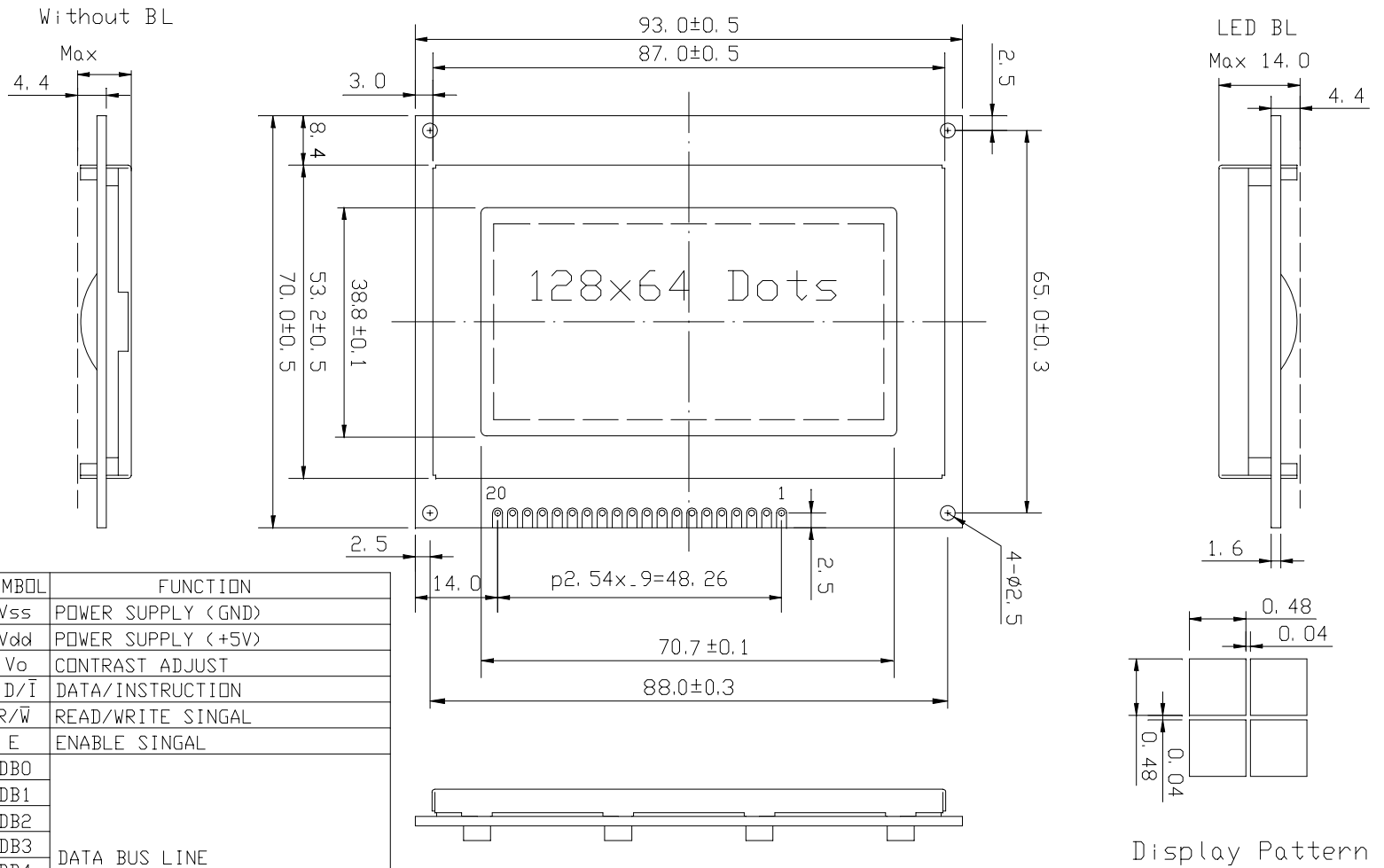
Fig. b Interface timing (data read)

9.0 RELIABILITY TEST

Storage Condition	Content	Evaluations and Assessment*		
		Current Consumption	Contrast	Other Appearances
Operation at high temperature and humidity	40°C,90% RH,240hrs	Twice initial value or less	More than 80% of initial value	No abnormality
High temperature storage	60°C, 240hrs	Twice initial value or less	More than 80% of initial value	No abnormality
Low temperature storage	-20°C, 240hrs	Twice initial value or less	More than 80% of initial value	No abnormality

*Evaluations and assessment to be made two hours after returning to room temperature (25°C–5°C).

*The LCDs subjected to the test must not have dew condensation.



PIN	SYMBOL	FUNCTION
1	Vss	POWER SUPPLY (GND)
2	Vdd	POWER SUPPLY (+5V)
3	Vo	CONTRAST ADJUST
4	D/$\overline{I}$	DATA/INSTRUCTION
5	R/$\overline{W}$	READ/WRITE SINGAL
6	E	ENABLE SINGAL
7	DB0	DATA BUS LINE
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	CS1	CHIP SELECT FOR IC1
16	CS2	CHIP SELECT FOR IC2
17	$\overline{RES}$	RESET
18	Vee	POWER SUPPLY FOR LCD DRIVING
19	BL-	POWER SUPPLY LED-
20	BL+	POWER SUPPLY LED+

Part No: AGM1264F

AZ DISPLAYS, INC.

	REVISION RECORD	NAME	DATE
1			
2			
3			
4			

REVISION: VER. 1

DRAWN BY: DATE:

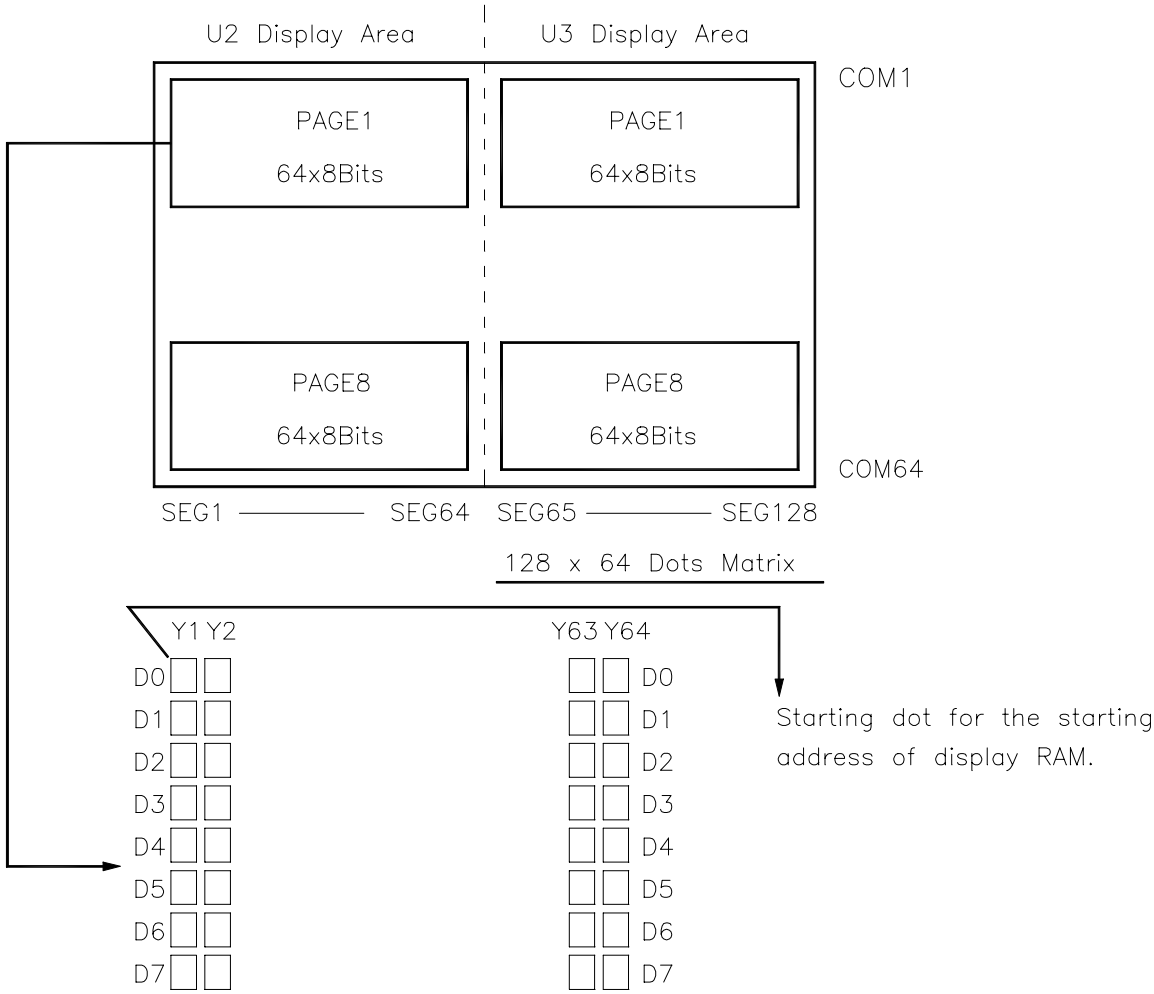
CHECKED BY: DATE:

APPROVED BY: DATE:

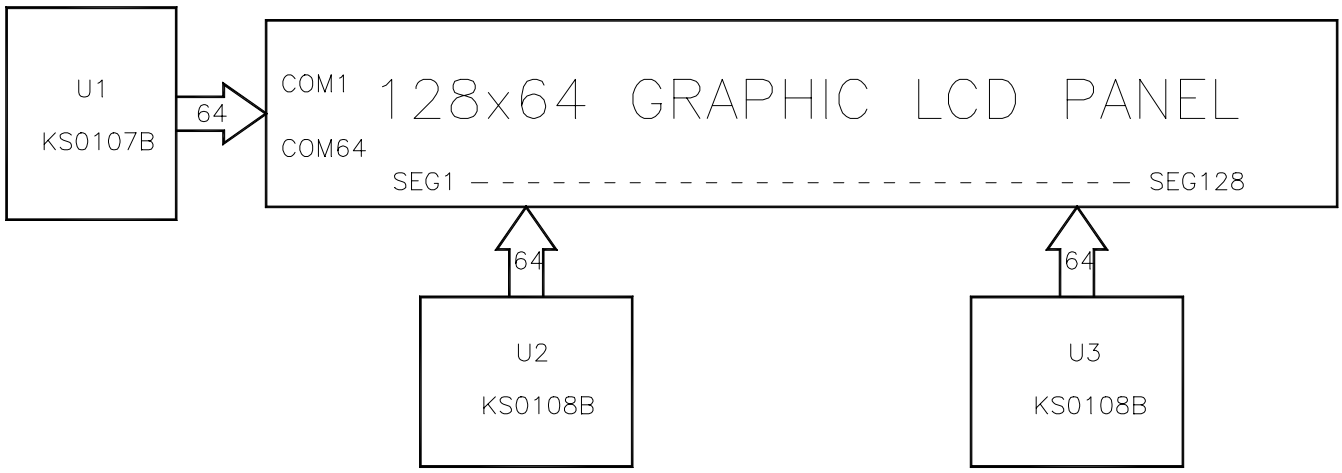
UNIT: MM

SCALE:

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.



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.