AZ DISPLAYS, INC.

Complete LCD Solutions

ACM1601D SERIES LCD MODULE

1.0 PHYSICAL DATA

Item	Nominal Dimensions / Available Options	Unit
Number of Characters	16 characters x 1 line	-
Character Format	5 x 7 dots with cursor	-
Overall Module Size (W x H x D)	122.0 x 33.0 x max 14.5 for LED backlight version 122.0 x 33.0 x max 9.5 for reflective version	mm
Dot Size (W x H)	0.92 x 1.10	mm
Dot Pitch (W x H)	0.98 x 1.16	mm
Duty	1/16	-
Controller IC	KS0066	-
LC Fluid Options	STN	-
Polarizer Options	Reflective, Transflective, Transmissive	-
Backlight Options	LED	-
Temperature Range Options	Standard, Wide temp	-

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 temp)	Top	-20	-	+70	°C
Storage temperature (Wide temp)	Tst	-30	-	+80	°C
Input voltage	V_I	V_{SS}	-	V_{DD}	V
Supply voltage for logic	V_{DD}-V_{SS}	0	5.0	6.5	V
Supply voltage for LCD drive (Standard)	V_{DD}-V_O	0	-	6.5	V
Supply voltage for LCD drive (Wide temp)	V_{DD}-V_O	0	-	13.5	V

3.0 OPTICAL CHARACTERISTICS (Ta = 25°C, V_{DD} = 5.0V ± 0.25V, STN LC Fluid)

Item	Symbol	Condition	Min	Typ	Max	Unit
Viewing angle (horizontal)	θ	Cr ≥ 2.0	±30	-	±45	deg
Viewing angle (vertical)	ϕ	Cr ≥ 2.0	60	-	80	deg
Contrast Ratio	Cr	ϕ=0°, θ=0°	4.5	-	10	
Response time (rise)	Tr	ϕ=0°, θ=0°	-	120	240	ms
Response time (fall)	Tf	ϕ=0°, θ=0°	-	155	310	ms

ACM1601D SERIES LCD MODULE

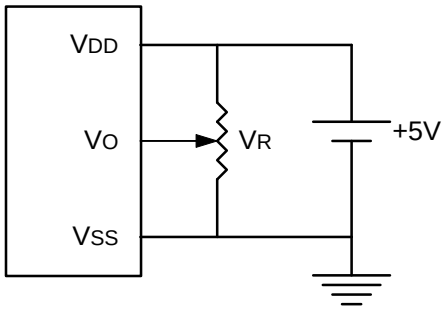
4.0 ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{DD} = 5.0V ± 0.25V)

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage for LCD drive (Std temp)	V_{DD}-V_O	Ta = 25°C		4.8		V
Supply voltage for LCD drive (Wide temp)	V_{DD}-V_O	Ta = 25°C		6.1		V
Input voltage	V_I	-	4.75	5.0	5.25	V
Input high voltage	V_{IH}	-	2.2	-	V_{DD}	V
Input low voltage	V_{IL}	-	0	-	0.6	V
Output high voltage	V_{OH}	I_{OH}=0.2mA	2.4	-	-	V
Output low voltage	V_{OL}	I_{OL}=1.2mA	-	-	0.4	V
Supply current	I_{DD}	V_{DD}=5.0V	-		2.0	mA
Input leakage current	I_{LKG}	-	-	-	1.0	uA
LED power supply current	I_{LED}	V_{LED}=5V, R=6.8Ω	-	120	-	mA

5.0 INTERFACE PIN CONNECTIONS

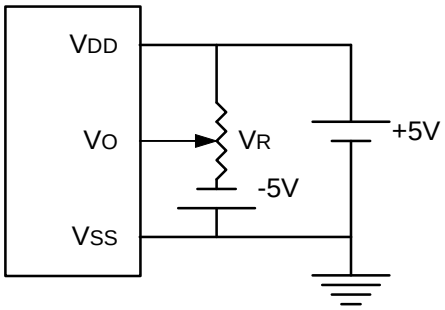
Pin No.	Symbol	Level	Pin Description	Function
1	V_{SS}	-	Ground	0V
2	V_{DD}	-	Supply voltage for logic	+5V
3	V_O	-	LCD contrast adjust	By user
4	RS	H/L	Register select	H: Data; L: Instruction code
5	R/W	H/L	Read / write	H: Data read, L: Data write
6	E	H, H→L	Enable	Start signal for data read/write
7	DB0	H/L	Data bit 0	8-bit interface
8	DB1	H/L	Data bit 1	8-bit interface
9	DB2	H/L	Data bit 2	8-bit interface
10	DB3	H/L	Data bit 3	8-bit interface
11	DB4	H/L	Data bit 4	4-bit or 8-bit interface
12	DB5	H/L	Data bit 5	4-bit or 8-bit interface
13	DB6	H/L	Data bit 6	4-bit or 8-bit interface
14	DB7	H/L	Data bit 7	4-bit or 8-bit interface
A	A	-	Anode for LED backlight	Power supply for LED backlight
K	K	-	Cathode for LED backlight	Power supply for LED backlight

6.0 POWER SUPPLY



Standard temp range

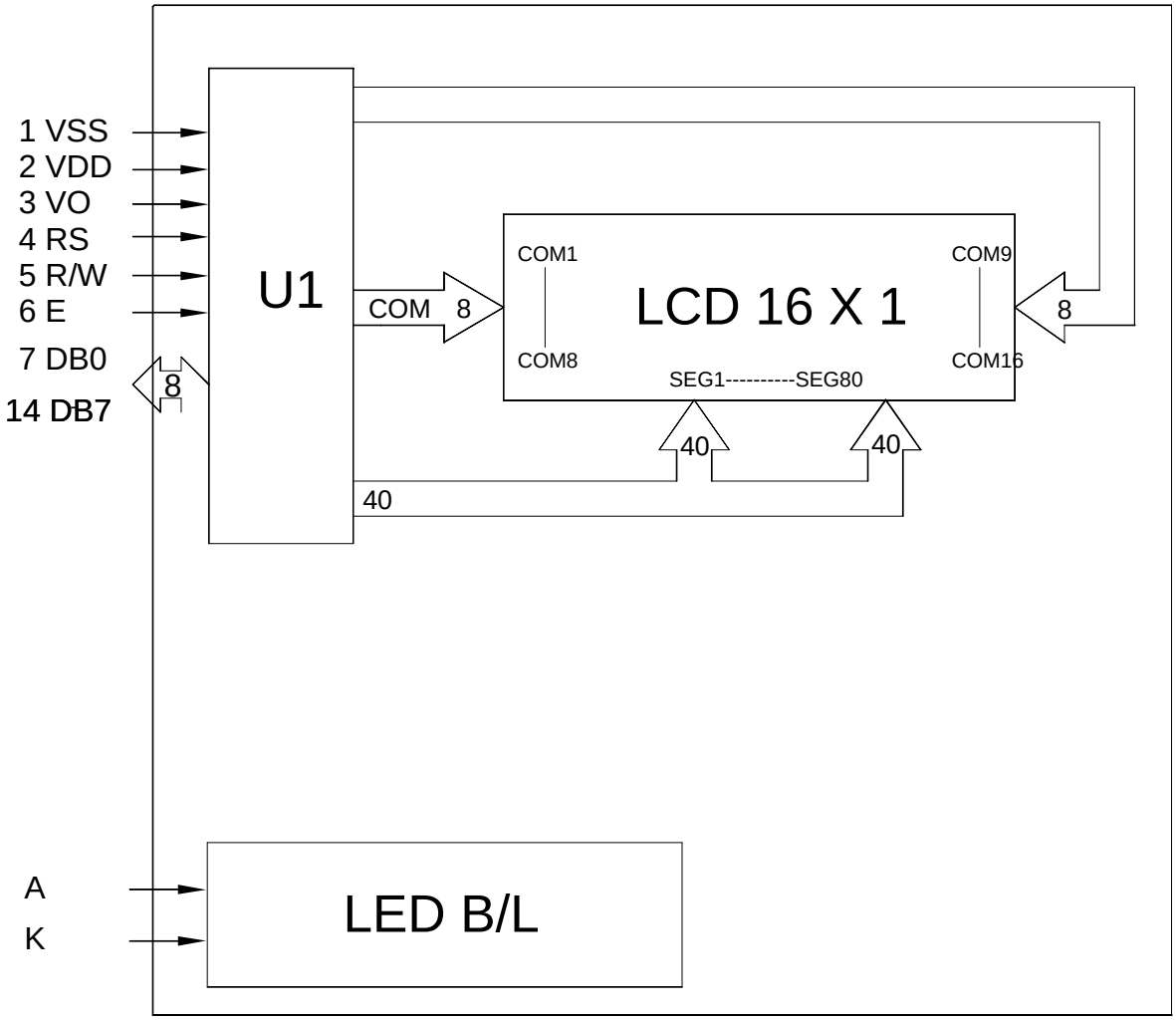
VR = 10KΩ ~ 20KΩ



Wide temp range

VR = 10KΩ ~ 20KΩ

7.0 BLOCK DIAGRAM



8.0 TIMING CHARACTERISTICS (KS0066 Controller)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Enable cycle time	t_{CYC}	Fig. a, Fig. b	500	-	-	ns
Enable pulse width	PW_{EH}	Fig. a, Fig. b	220	-	-	ns
Enable rise/fall time	t_{Er} , t_{Ef}	Fig. a, Fig. b	-	-	25	ns
RS, R/W set up time	t_{AS}	Fig. a, Fig. b	40	-	-	ns
RS, R/W hold time	t_{H1}	Fig. a, Fig. b	10	-	-	ns
Data set up time	t_{DSW}	Fig. a	60	-	-	ns
Data hold time	t_{H2}	Fig. a	10	-	-	ns
Data delay time	t_{DDR}	Fig. b	-	-	120	ns
Data hold time	t_{H2}	Fig. b	20	-	-	ns

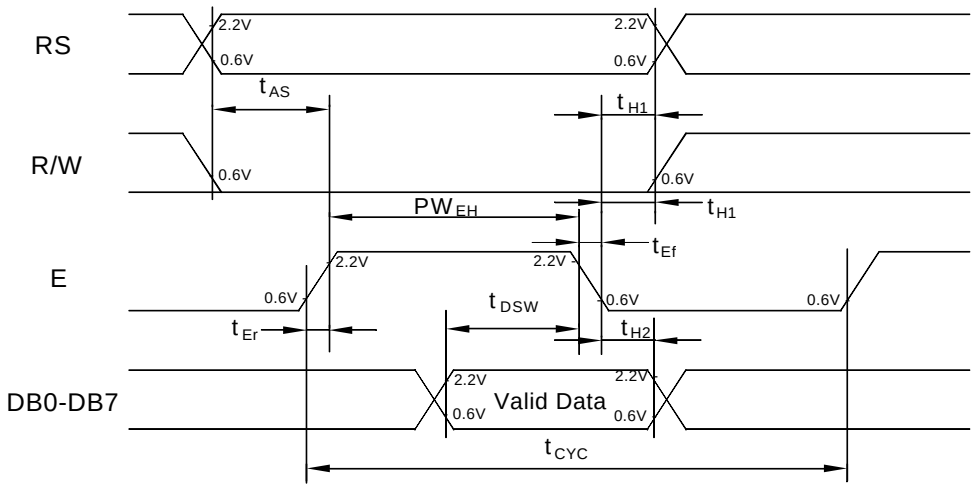


Fig. a Interface timing (data write)

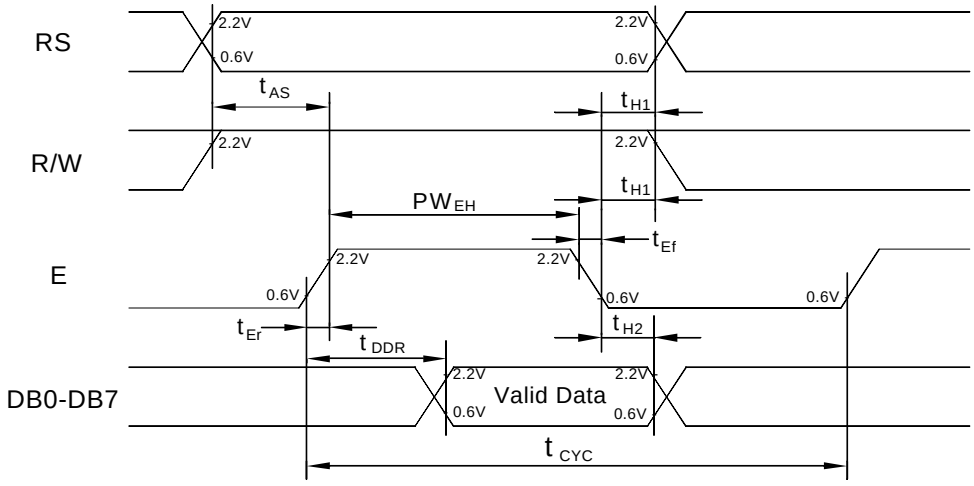
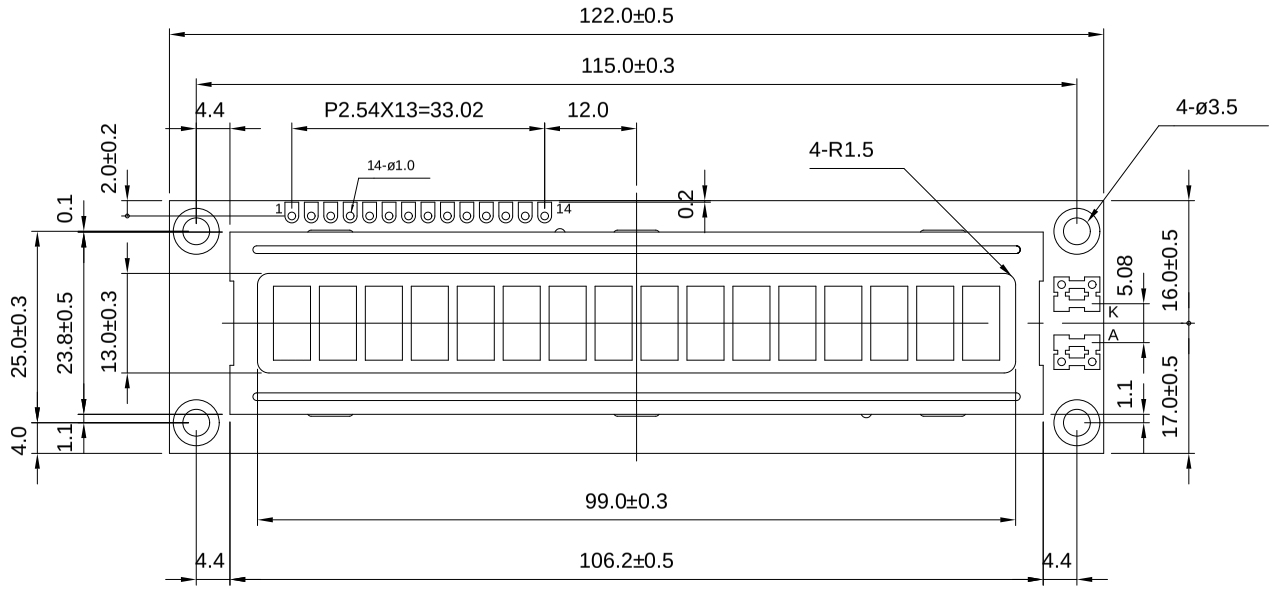
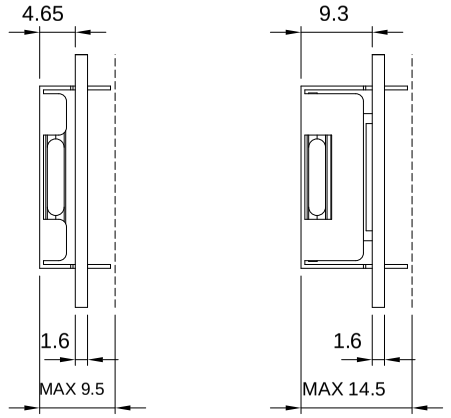


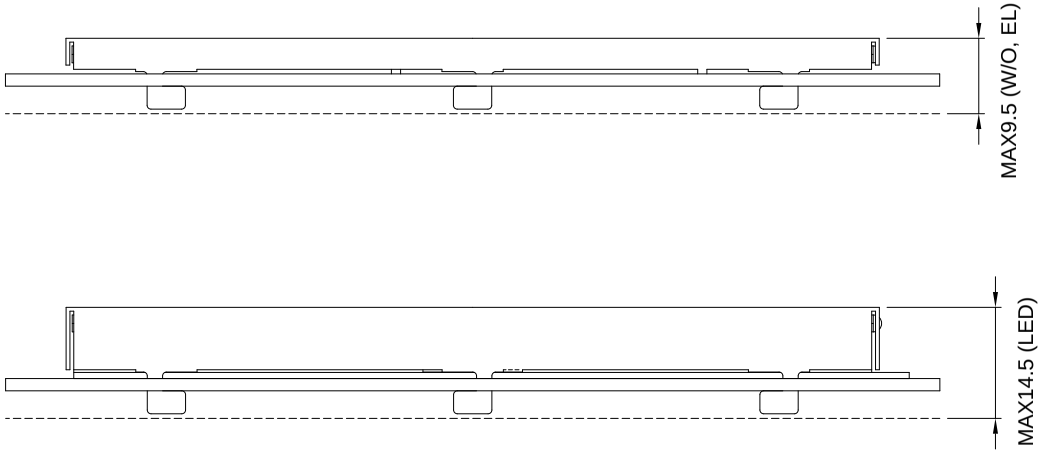
Fig. b Interface timing (data read)

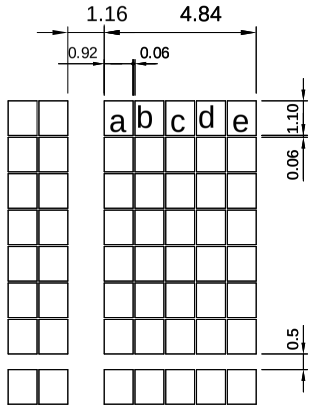




W/O B.L.
EL B.L.

LED B.L.





Pin No.	Symbol
1	V_{SS}
2	V_{DD}
3	V_0
4	RS
5	R/W
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7

	NAME	DATE
APPROVE		
CHECK		
DESIGN		
DRAW		

AZ DISPLAYS, INC.

TITLE

DWG-NO ACM1601D

THIRD ANGLE PROJECT

UNIT : mm

SCALE : NONE