

AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER:

ACM 0802C SERIES

DATE:

September 15, 1999

ACM0802C SERIES LCD MODULE

1.0 MECHANICAL SPECS

| | |
|------------------------------|--|
| 1. Overall Module Size | 58.0mm(W) x 32.0mm(H) x max 12.8mm(D) for LED backlight version 58.0mm(W) x 32.0mm(H) x max 8.6mm(D) for reflective version |
| 2. Dot Size | 0.56mm(W) x 0.66mm(H) |
| 3. Dot Pitch | 0.60mm(W) x 0.70mm(H) |
| 4. Duty | 1/16 |
| 5. Controller IC | KS0066 |
| 6. LC Fluid Options | TN, STN |
| 7. Polarizer Options | Reflective, Transflective, Transmissive |
| 8. Backlight Options | LED |
| 9. 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 | 2.7 | - | 5.5 | V |
| Supply voltage for LCD drive | Vdd- Vo | 3.0 | 4.6 | 6.5 | V |

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3.0 ELECTRICAL CHARACTERISTICS

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|--|----------------|-------------------------------------|-----|-----|----------|------|
| Input voltage (high) | V_{ih} | H level | 2.2 | - | V_{dd} | V |
| Input voltage (low) | V_{il} | L level | 0 | - | 0.6 | V |
| Recommended LC Driving Voltage (Standard Temp) | $V_{dd} - V_o$ | 0°C | - | 4.8 | 5.4 | V |
| | | 25°C | 4.2 | 4.6 | - | |
| | | 50°C | 3.9 | 4.3 | - | |
| Recommended LC Driving Voltage (Wide Temp) | $V_{dd} - V_o$ | -20°C | - | 6.4 | 7.2 | V |
| | | 0°C | - | 4.8 | - | |
| | | 50°C | - | 4.3 | - | |
| | | 70°C | 3.7 | 4.1 | - | |
| Power Supply Current | I_{dd} | $V_{dd}=5.0V$, $f_{osc}=270kHz$ | - | 0.5 | 1.0 | mA |
| LED Power Supply Voltage | V_{fled} | $R=6.8\Omega$ | - | 4.6 | 5.0 | V |
| LED Power Supply Current | I_{fled} | $R=6.8\Omega$ | - | 70 | 175 | mA |

4.0 OPTICAL CHARACTERISTICS (Ta=25°C, Vdd= 5.0V±0.25V, TN LC fluid)

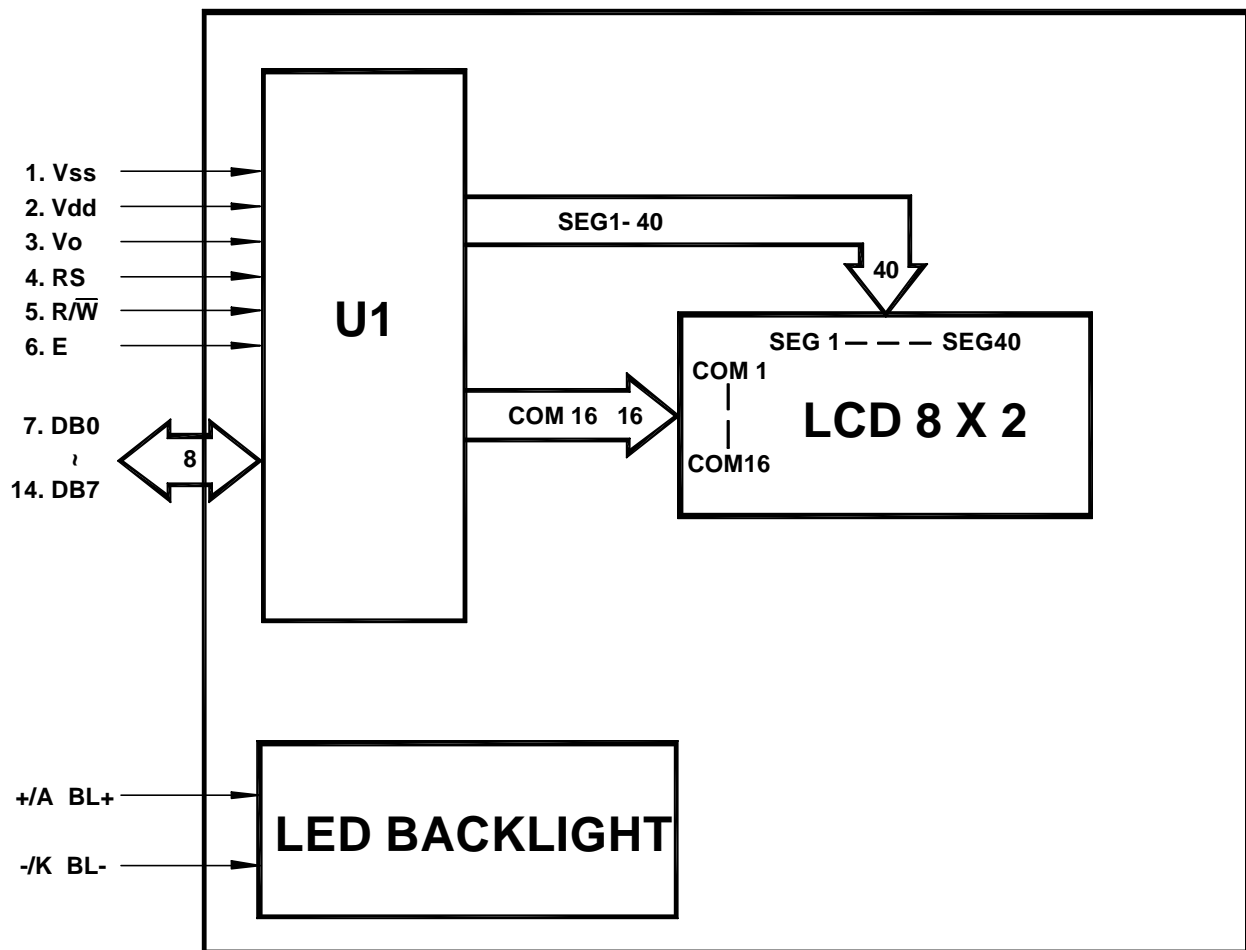
| Item | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------|----------|--------------------------------|-----|-----|-----|------|
| Viewing angle (horizontal) | θ | $C_r \geq 4.0$ | -25 | - | - | deg |
| Viewing angle (vertical) | ϕ | $C_r \geq 4.0$ | -30 | - | 30 | deg |
| Contrast Ratio | C_r | $\phi=0^\circ, \theta=0^\circ$ | - | 2 | - | |
| Response time (rise) | T_r | $\phi=0^\circ, \theta=0^\circ$ | - | 120 | 150 | ms |
| Response time (fall) | T_f | $\phi=0^\circ, \theta=0^\circ$ | - | 120 | 150 | ms |

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4.1 OPTICAL CHARACTERISTICS (Ta=25°C, Vdd= 5.0V±0.25V, STN LC fluid)

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------|----------|--------------------------------|-----|-----|-----|------|
| Viewing angle (horizontal) | θ | $Cr \geq 2.0$ | -60 | - | 35 | deg |
| Viewing angle (vertical) | ϕ | $Cr \geq 2.0$ | -40 | - | 40 | deg |
| Contrast Ratio | Cr | $\phi=0^\circ, \theta=0^\circ$ | - | 6 | - | |
| Response time (rise) | Tr | $\phi=0^\circ, \theta=0^\circ$ | - | 150 | 250 | ms |
| Response time (fall) | Tf | $\phi=0^\circ, \theta=0^\circ$ | - | 150 | 250 | ms |

5.0 BLOCK DIAGRAM

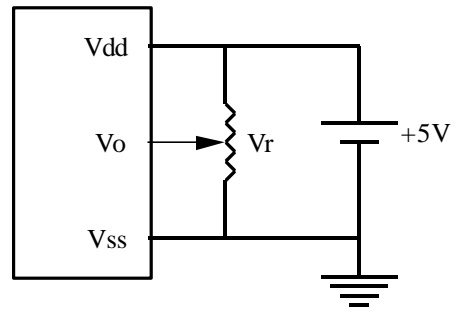


ACM0802C SERIES LCD MODULE

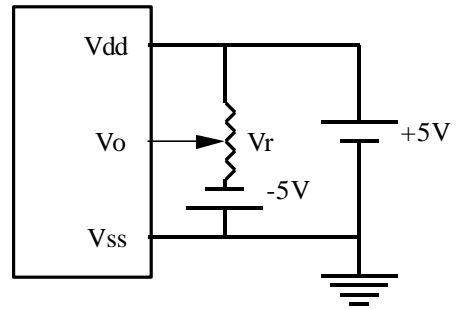
6.0 PIN ASSIGNMENT

| Pin No. | Symbol | Function |
|---------|-----------------|----------------------|
| 1 | V _{ss} | Ground |
| 2 | V _{dd} | +5V |
| 3 | V _o | LCD contrast adjust |
| 4 | RS | Register select |
| 5 | R/W | Read / write |
| 6 | E | Enable |
| 7 | DB0 | Data bit 0 |
| 8 | DB1 | Data bit 1 |
| 9 | DB2 | Data bit 2 |
| 10 | DB3 | Data bit 3 |
| 11 | DB4 | Data bit 4 |
| 12 | DB5 | Data bit 5 |
| 13 | DB6 | Data bit 6 |
| 14 | DB7 | Data bit 7 |
| +A | BL+ | Power Supply for BL+ |
| -K | BL- | Power Supply for BL- |

7.0 POWER SUPPLY



STANDARD TEMP RANGE



WIDE TEMP RANGE

$$V_R = 10K\Omega \sim 20K\Omega$$

8.0 TIMING CHARACTERISTICS

| Item | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|-----------------------|------------|----------------|------|------|------|------|
| Enable cycle time | t_c | Fig. a, Fig. b | 500 | - | - | ns |
| Enable pulse width | t_w | Fig. a, Fig. b | 220 | - | - | ns |
| Enable rise/fall time | t_r, t_f | Fig. a, Fig. b | - | - | 25 | ns |
| RS, R/W set up time | t_{su} | Fig. a, Fig. b | 40 | - | - | ns |
| RS, R/W hold time | t_h | Fig. a, Fig. b | 10 | - | - | ns |
| Data delay time | t_d | Fig. b | - | - | 120 | ns |
| Data set up time | t_{dsu} | Fig. a | 60 | - | - | ns |
| Data hold time | t_{dh} | Fig. a, Fig. b | 20 | - | - | ns |

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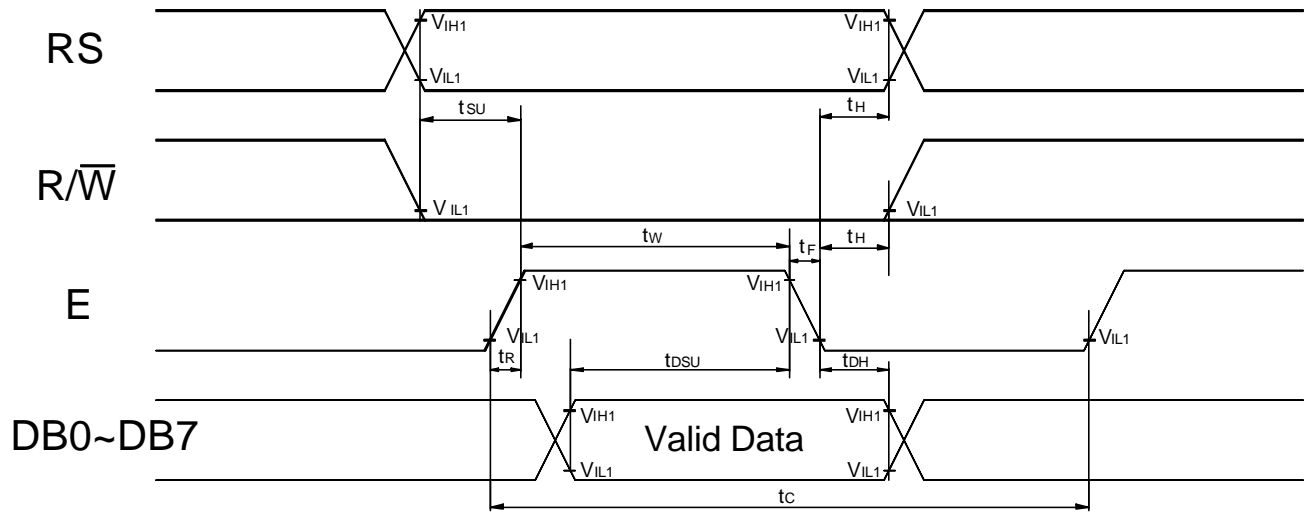


Fig. a Interface timing (data write)

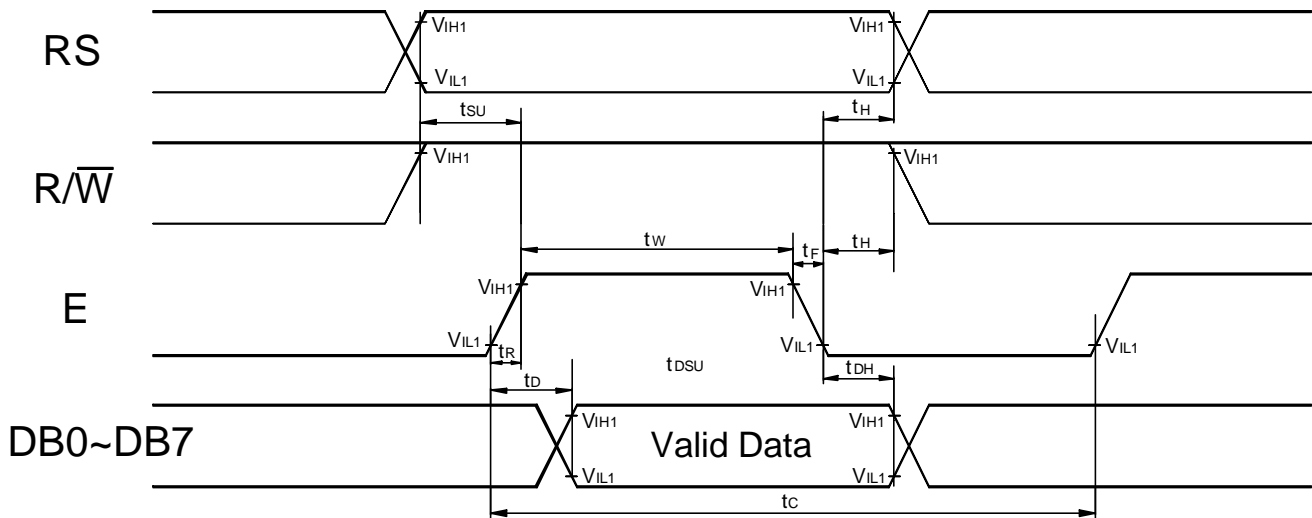
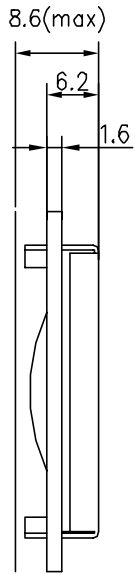


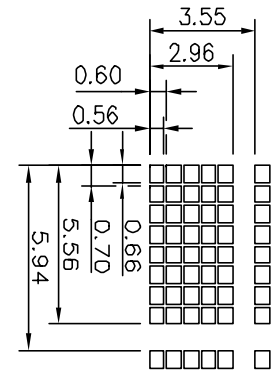
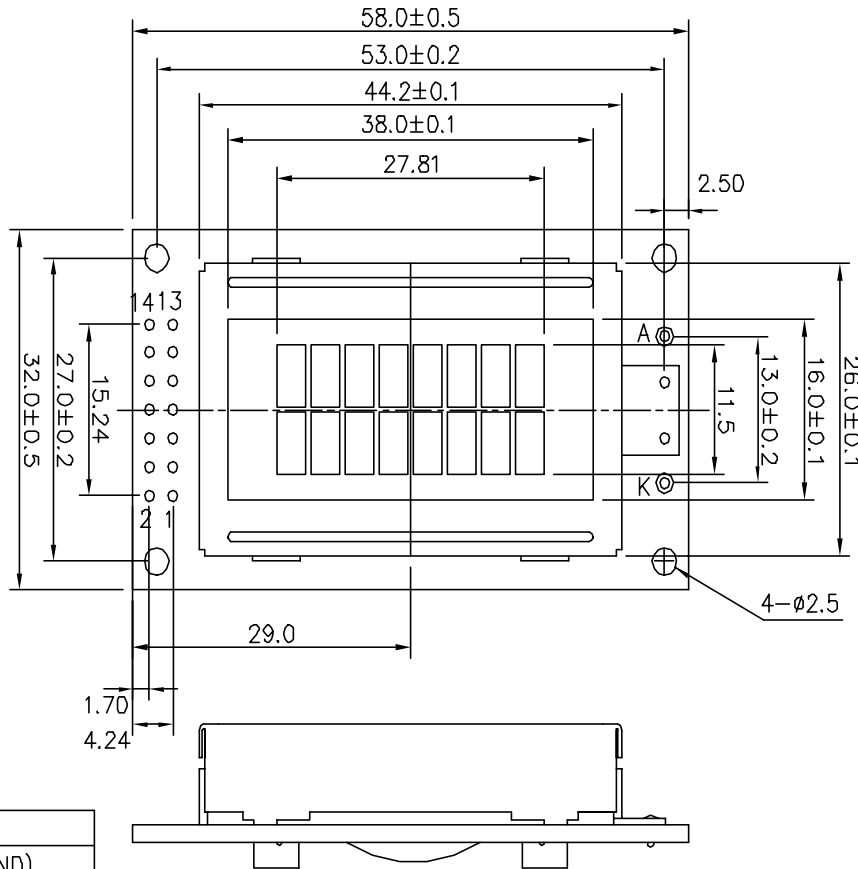
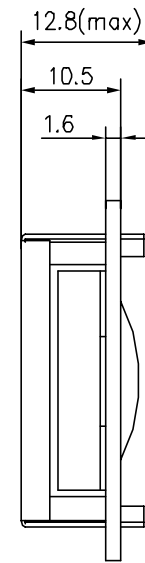
Fig. b Interface timing (data read)

9.0 MECHANICAL DIAGRAM

Without BKL



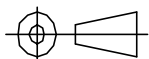
LED BKL



Display Pattern

| PIN | SYMBOL | FUNCTION |
|-------|--------|----------------------|
| 1 | Vss | POWER SUPPLY (GND) |
| 2 | Vdd | POWER SUPPLY (+5V) |
| 3 | Vo | CONTRAST ADJUST |
| 4 | RS | REGISTER SELECT |
| 5 | R/W | READ/WRITE SIGNAL |
| 6 | E | ENABLE SIGNAL |
| 7 | DB0 | DATA BUS LINE |
| 8 | DB1 | |
| 9 | DB2 | |
| 10 | DB3 | |
| 11 | DB4 | |
| 12 | DB5 | |
| 13 | DB6 | |
| 14 | DB7 | |
| + / A | BL+ | POWER SUPPLY FOR BL+ |
| - / K | BL- | POWER SUPPLY FOR BL- |

NOTE:
UNLESS OTHERWISE SPECIFIED STANDARD
TOLERANCE ±0.5MM.

| | | | | | |
|---|--|--------------------------|------|------------------|--------------------|
| TITLE: ACM0802C SERIES LCD MODULE | | AZ DISPLAYS, INC. | | | |
| REVISION RECORD | | NAME | DATE | DRAWING NO.: | DRAWN BY: |
| 1 | | | | ACM0802C-LCM--01 | CHECKED BY: |
| 2 | | | | | APPROVED BY: |
| 3 | | | | REVISION: | DATE: |
| 4 | | | | VER.2 | DATE: |
|  | | | | | UNIT: MM SCALE: |