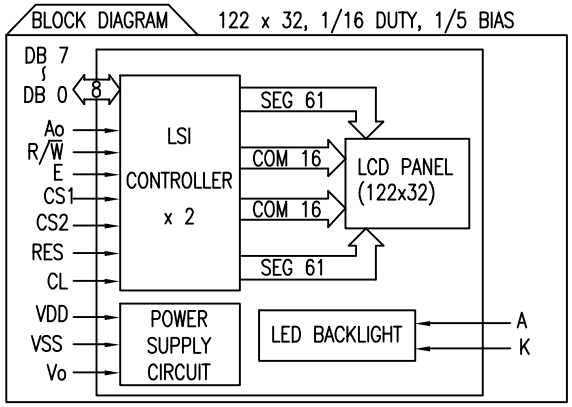
UNCONTROLLED DOCUMENT

A B

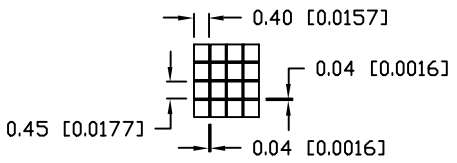
| PART NUMBER | REV. |
|---|---|
| LCM–X12232GXX | B |

| REV. | E.C.N. NUMBER AND REVISION COMMENTS | DATE |
|---|---|---|
| A | E.C.N. #10433./ | 6–8–98 |
| B | E.C.N. #10BRDR. & REDRAWN. | 10–2–98 |

BLOCK DIAGRAM — 122 x 32, 1/16 DUTY, 1/5 BIAS

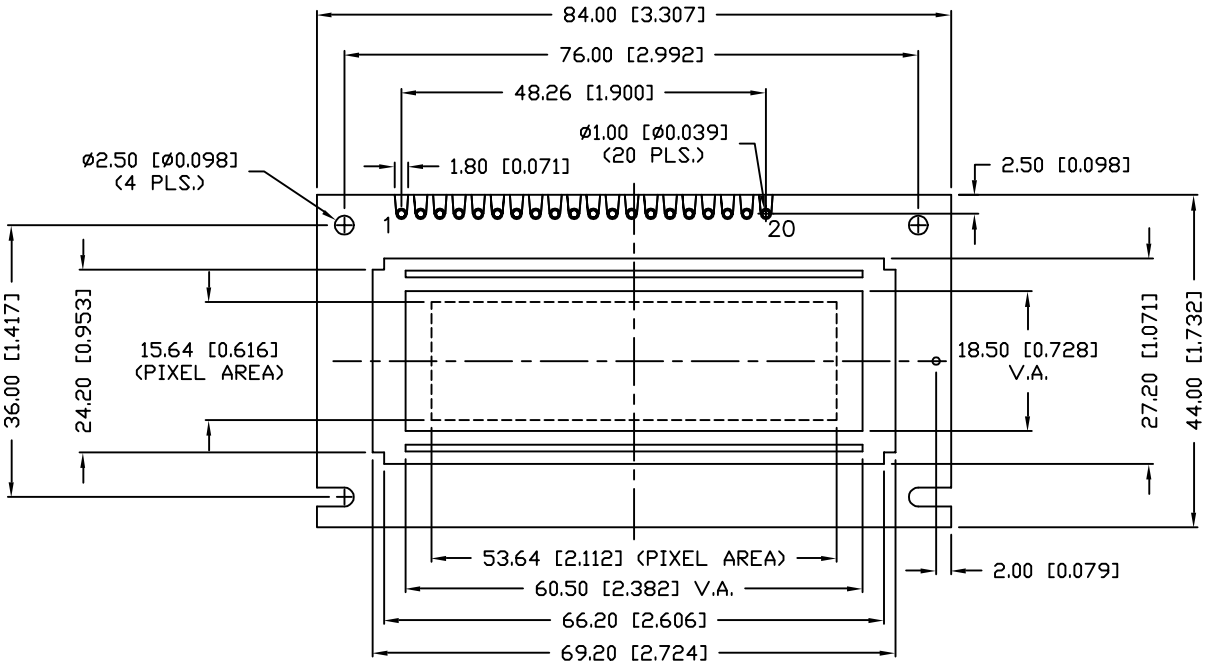


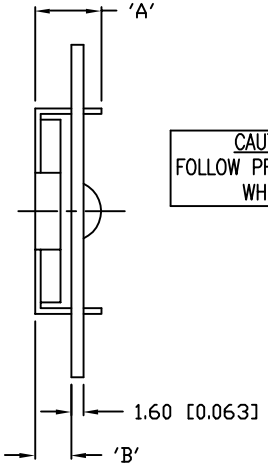

PIXEL DETAIL




| P/N PREFIX/SUFFIX TABLE | | | |
|---|---|---|---|
| LCM–X | | DXX | DESCRIPTION |
| STANDARD | S | SR | STN, REFLECTIVE |
| HIGH TEMP. | H | SF | STN, TRANSFLECTIVE(W/ BACKLIGHT) |

| TYPE DIM. | A | B |
|---|---|---|
| WITH BACKLIGHT | 12.7 | 8.7 |
| NO BACKLIGHT | 8.8 | 4.8 |




CAUTION: STATIC SENSITIVE DEVICE
FOLLOW PROPER E.S.D. HANDLING PROCEDURES
WHEN WORKING WITH THIS PART.

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*UNLESS OTHERWISE SPECIFIED TOLERANCE IS ±0.25mm (±0.010")

| REV. | PART NUMBER |
|---|---|
| B | LCM–X12232GXX |

122 x 32 DOT MATRIX GRAPHIC MODULE,
1/16 DUTY, 1/5 BIAS.


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RELIABILITY NOTE
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|---|---|---|---|
| SA/BC | | | PAGE: 1 OF 2 |
| | | | SCALE: N/A |

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| PART NUMBER | REV. |
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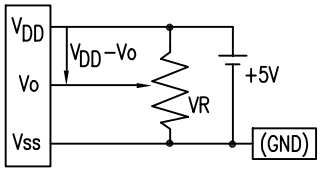
|---|---|---|
| | SEE PAGE #1./ | |

## PIN CONFIGURATION [A]

| PIN NO. | SYMBOL | LEVEL | FUNCTION | |
|---|---|---|---|---|
| 1 | Vss | – | POWER SUPPLY | GND (0V) |
| 2 | $V_{DD}$ | – | | 5V |
| 3 | Vo | – | | FOR LCD DRIVE |
| 4 | Ao | H/L | REGISTER SELECT SIGNAL<br>H: DATA INPUT<br>L: INSTRUCTION INPUT | |
| 5 | CS1 | H,H->L | CHIP SELECT SIGNAL FOR IC1 | |
| 6 | CS2 | H,H->L | CHIP SELECT SIGANL FOR IC2 | |
| 7 | CL | H/L | CLOCK INPUT (2kHz) | |
| 8 | E | H/L | ENABLE SIGNAL (NO PULL-UP RESISTOR) | |
| 9 | R/$\overline{W}$ | H/L | H: DATA READ (MODULE-->MPU)<br>L: DATA WRITE (MODULE<--MPU) | |
| 10~17 | DB0~DB7 | H/L | DATA BIT 0-7 | |
| 18 | RST | L | RESET SIGNAL | |
| 19 | A | – | ANODE | LED BACKLIGHT |
| 20 | K | – | CATHODE | LED BACKLIGHT |

$V_{DD}$-Vo: LCD DRIVING VOLTAGE
VR: 10KΩ -20KΩ




## READ/WRITE TIMING FOR 68 PORT MPU

| PARAMETER | | SIGNAL | SYMBOL | MIN | MAX | UNIT |
|---|---|---|---|---|---|---|
| ADDRESS HOLD TIME | | CS<br>R/$\overline{W}$<br>Ao | $t_{AH6}$ | 10 | – | ns |
| ADDRESS SETUP TIME | | | $t_{AS6}$ | 20 | – | ns |
| SYSTEM CYCLE TIME | | | $t_{CYC6}$ | 1000 | – | ns |
| DATA SETUP TIME | | DO~D7 | $t_{DS6}$ | 80 | – | ns |
| DATA HOLD TIME | | | $t_{DH6}$ | 10 | – | ns |
| OUTPUT DISABLE TIME | | | $t_{OH6}$ | 10 | 60 | ns |
| ACCESS TIME | | | $t_{ACC6}$ | – | 90 | ns |
| ENABLE PULSE WIDTH | (READ) | E | $t_{EW}$ | 100 | – | ns |
| | (WRITE) | | | 80 | – | ns |

## ELECTRICAL CHARACTERISTICS

$V_{DD}$=4.5V to 5.5V, $T_A$=25°C

| ITEM | | SYMBOL | CONDITION | STANDARD VALUE | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | MIN. | TYP. | MAX. | |
| SUPPLY VOLTAGE FOR LOGIC | | $V_{DD}$-Vss | – | – | 5.0 | – | V |
| SUPPLY CURRENT FOR LOGIC | | $I_{DD}$ | $V_{DD}$=5V | – | – | 3.0 | mA |
| INPUT VOLTAGE** | HIGH | $V_{IH}$ | – | 0.2 | – | $V_{DD}$ | V |
| | LOW | $V_{IL}$ | – | 0 | – | 0.8 | V |
| OUTPUT VOLTAGE*** | HIGH | $V_{OH}$ | $I_{OH}$ =-3mA | 2.4 | – | – | V |
| | LOW | $V_{OL}$ | $I_{OL}$=3ma | – | – | 0.4 | V |
| *LED BACKLIGHT | VOLTAGE | Vf | – | – | 4.2 | 4.6 | V |
| | CURRENT | If | – | – | 170 | 330 | mA |
| | POWER CUNSUMPTION | PD | – | – | 710 | – | mW |
| | LUMINOUS | L | If=170mA | 70 | – | – | cd/m² |
| | COLOR | – | – | – | – | – | nm |

*ONLY APPLIES TO MODULES WITH BACKLIGHT
[A] **APPLIED TO TERMINALS DB0~DB7
***APPLIED TO TERMINALS E, Ao, DB0~DB7

## ABSOLUTE MAXIMUM RATINGS

| ITEM | SYMBOL | TEST CONDITION | STANDARD VALUE MIN | STANDARD VALUE MAX | UNIT |
|---|---|---|---|---|---|
| SUPPLY VOLTAGE FOR LOGIC | $V_{DD}$-Vss | Ta=25°C | 4.75 | 5.25 | V |
| SUPPLY VOLTAGE FOR LCD DRIVE | $V_{DD}$-Vo | – | 4.8@50°C | 5.2@0°C | V |
| INPUT VOLTAGE | $V_I$ | Ta=25°C | Vss | $V_{DD}$ | V |
| OPERATING TEMPERATURE | Topr | LCM-S | 0 | 50 | °C |
| | | LCM-H | -20 | 70 | °C |
| STORAGE TEMPERATURE | Tstg | LCM-S | -20 | 70 | °C |
| | | LCM-H | -30 | 85 | °C |

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122 x 32 DOT MATRIX GHAPHIC MODULE,
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