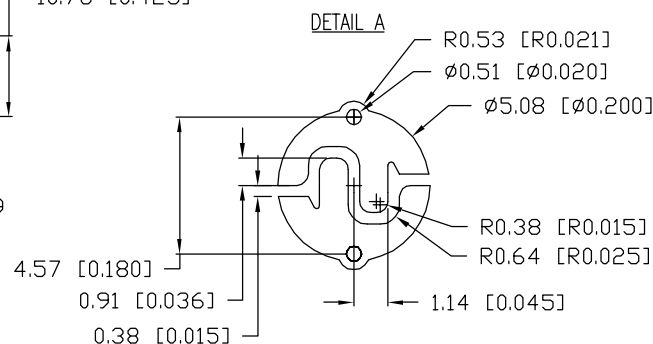
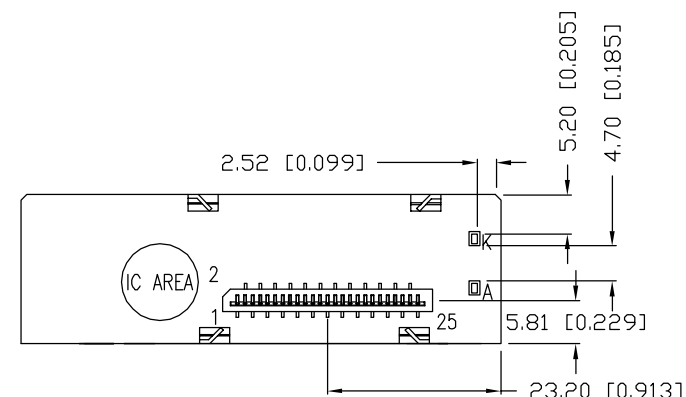
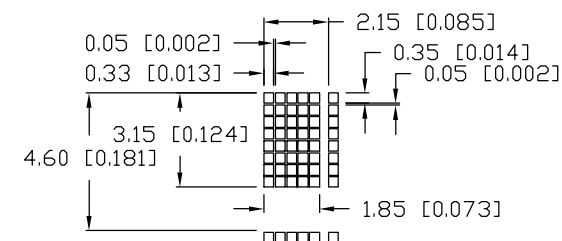
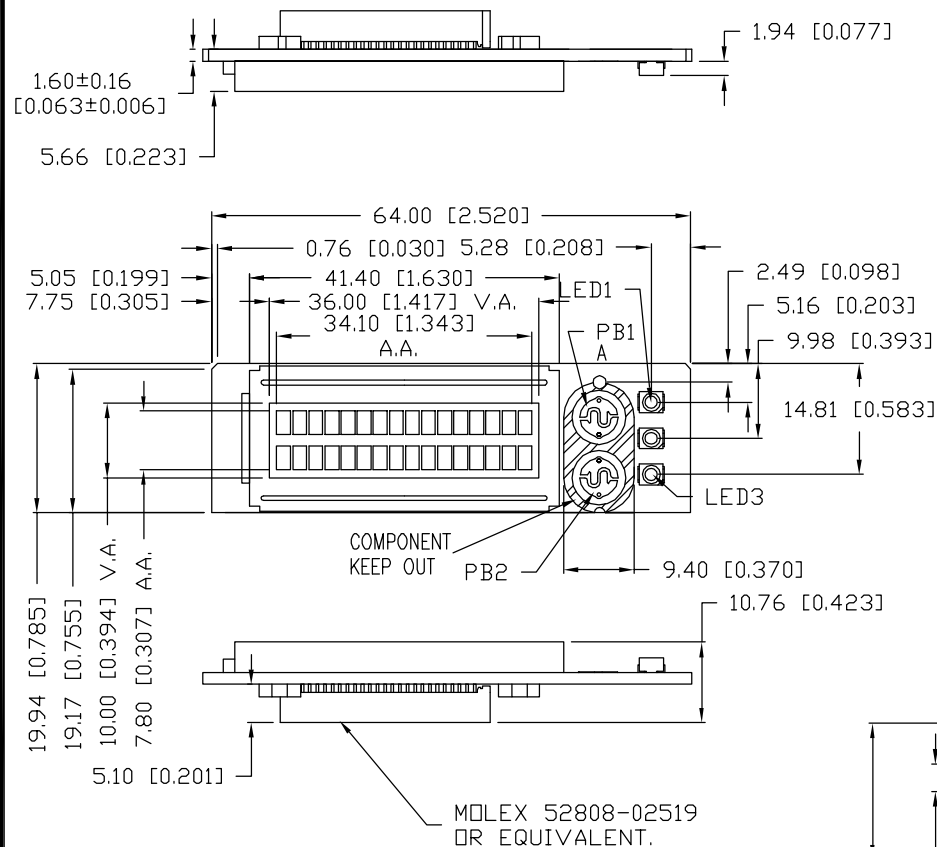


PRELIMINARY IN P/N DIR



\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN.= +DECIMAL PRECISION -0.00 MAX.= +0.00 -DECIMAL PRECISION

REV.

PART NUMBER

P4

LCM-H01602DSF43524

CUSTOM 16 X 2 LCD CHARACTER MODULE,  
GREEN LED BACKLIGHT, FLEX CABLE CONNECTOR.

CONFIDENTIAL INFORMATION  
THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF LUMEX INC. EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING BY LUMEX INC., THE HOLDER OF THIS DOCUMENT SHALL KEEP ALL INFORMATION CONTAINED HEREIN CONFIDENTIAL AND SHALL PROTECT SAME IN WHOLE OR IN PART FROM DISCLOSURE AND DISSEMINATION TO ALL THIRD PARTIES.

RELIABILITY NOTE  
OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.

**LUMEX**  
Creating LED and LCD Solutions Together™

290 E. HELEN ROAD  
PALATINE, IL 60067-6976  
PHONE: +1.847.359.2790  
US WEB: www.lumex.com  
TW WEB: www.lumex.com.tw

DRAWN BY:

CHECKED BY:

APPROVED BY:

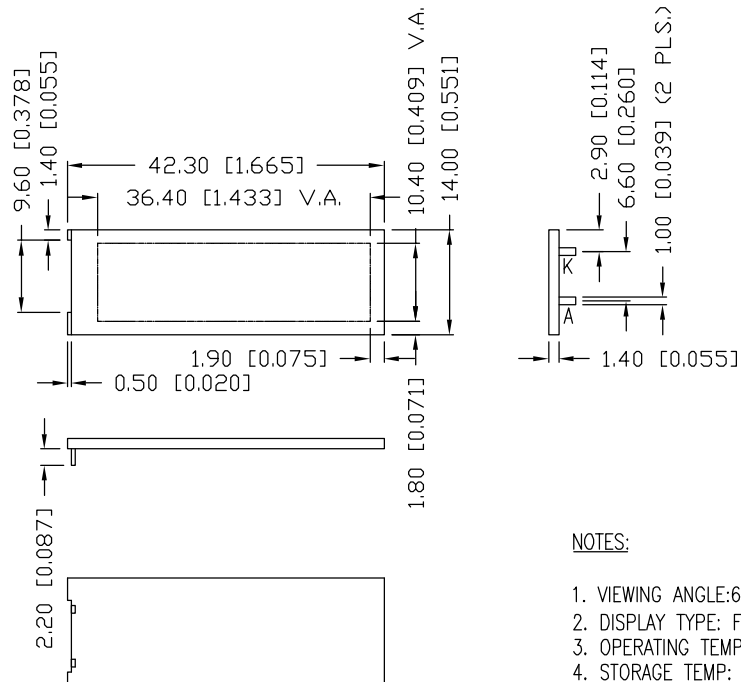
DATE: 06.05.09

JN

PAGE: 1 OF 4

SCALE: N/A

PRELIMINARY IN P/N DIR



## NOTES:

1. VIEWING ANGLE: 6 O'CLOCK.
2. DISPLAY TYPE: FSTN, TRANSMISSIVE/POSITIVE.
3. OPERATING TEMP: -20°C TO 70°C.
4. STORAGE TEMP: -30°C TO 80°C.
5. UNIFORMITY 70%(MIN); LUMINANCE 15cd/m2(MIN).
6. THIS PRODUCT CONFORMS TO ROHS. 6/6.

BACKLIGHT SPECIFICATION  $T_A=25^\circ\text{C}$ 

| PARAMETER          | MIN         | TYP | MAX | UNITS           | TEST COND            |
|--------------------|-------------|-----|-----|-----------------|----------------------|
| PEAK WAVELENGTH    |             | 565 |     | nm              |                      |
| FORWARD VOLTAGE    |             | 2.2 | 2.6 | $V_f$           |                      |
| REVERSE VOLTAGE    | 3           |     |     | $V_r$           | $V_r=100\mu\text{A}$ |
| LUMINOUS INTENSITY | TBD         | TBD |     | $\text{cd/m}^2$ | $I_f=20\text{ mA}$   |
| EMITTED COLOR:     | GREEN       |     |     |                 |                      |
| REFLECTOR FINISH:  | CLEAR WHITE |     |     |                 |                      |

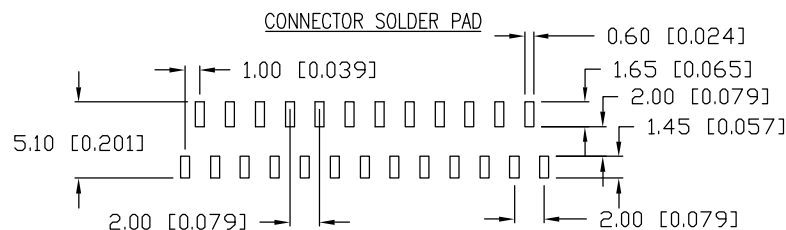
## LIMITS OF SAFE OPERATION AT 25°C

| PARAMETER             | SYMBOL    | MAX        | UNITS      |
|-----------------------|-----------|------------|------------|
| PULSE FORWARD CURRENT | $I_p$     | 30         | mA         |
| STEADY CURRENT        | $I_F$     | 20         | mA         |
| POWER DISSIPATION     | $P_D$     | 66         | mW         |
| OPERATING TEMP.       | $T_{OPR}$ | -20 TO +70 | °C         |
| STORAGE TEMP.         | $T_{STG}$ | -30 TO +80 | °C         |
| SOLDERING TEMP.       |           | +260       | °C         |
| 2.0mm FROM BODY       |           |            | 3 SEC. MAX |

\*DUTY 1/10 PULSE WIDTH 10ms

## BILL OF MATERIALS

1. LCD
2. DOUBLE SLIDED PCB.
3. GREEN LED BACKLIGHT.
4. MOLEX 52808-02519 OR EQUIVALENT (1 PCS.)
5. SML-LX2832GYC-TR (3 PCS.)
6. SITRONIX ST-7070 OR EQUIVALENT. (1 PCS.)
7. CONDUCTIVE NICKEL PLATED BEZEL. (1 PCS.)



\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN.= +DECIMAL PRECISION -0.00 MAX.= +0.00 -DECIMAL PRECISION

REV.

PART NUMBER

P4

LCM-H01602DSF43524

CUSTOM 16 X 2 LCD CHARACTER MODULE,  
 GREEN LED BACKLIGHT, FLEX CABLE CONNECTOR.

## CONFIDENTIAL INFORMATION

THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF LUMEX INC. EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING BY LUMEX INC., THE HOLDER OF THIS DOCUMENT SHALL KEEP ALL INFORMATION CONTAINED HEREIN CONFIDENTIAL AND SHALL PROTECT SAME IN WHOLE OR IN PART FROM DISCLOSURE AND DISSEMINATION TO ALL THIRD PARTIES.

## RELIABILITY NOTE

OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.

**LUMEX**  
 Creating LED and LCD Solutions Together™

290 E. HELEN ROAD  
 PALATINE, IL 60067-6976  
 PHONE: +1.847.359.2790  
 US WEB: www.lumex.com  
 TW WEB: www.lumex.com.tw

DRAWN BY:

CHECKED BY:

APPROVED BY:

DATE: 06.05.09

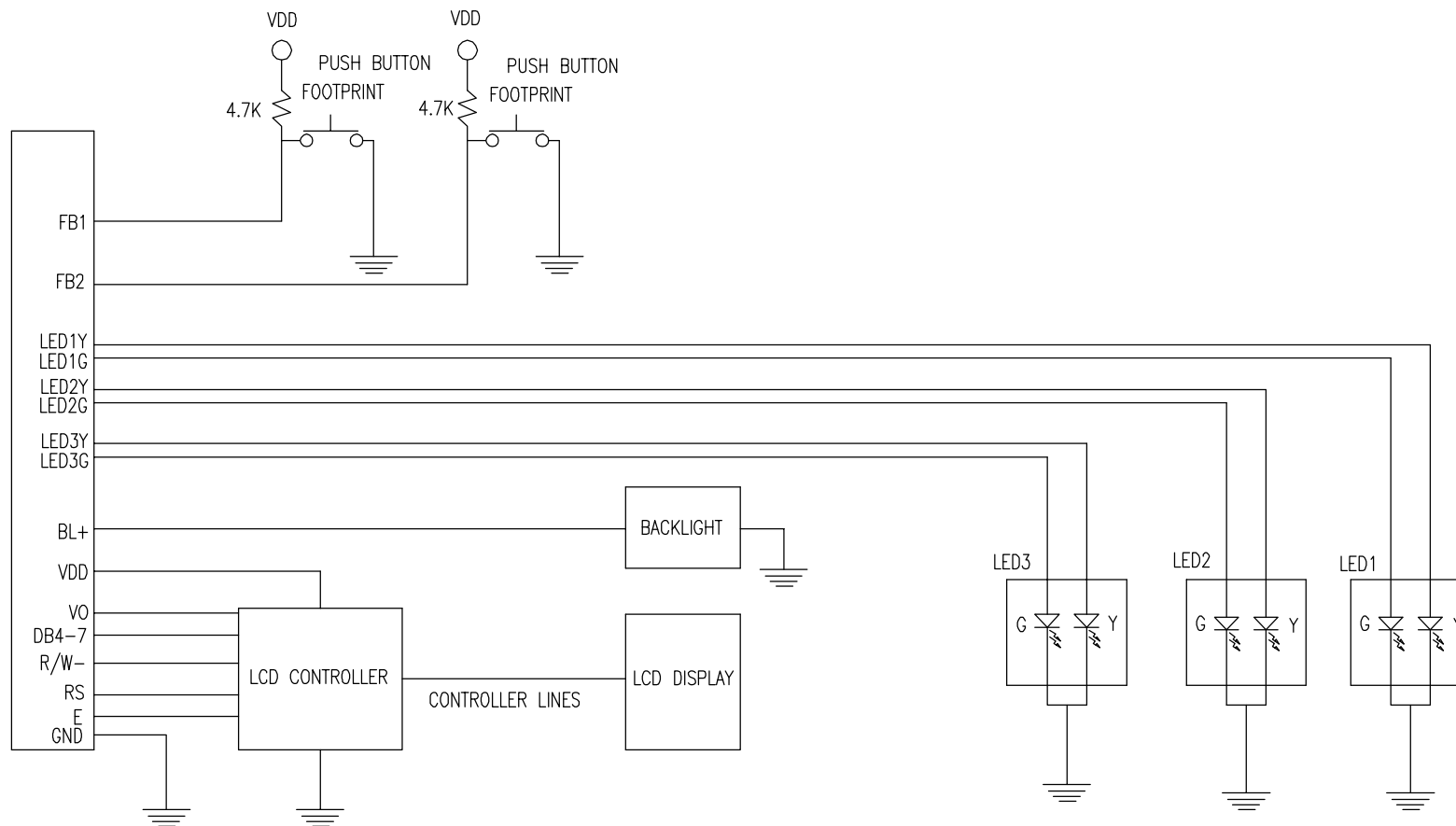
JN

PAGE: 2 OF 4

SCALE: N/A

UNCONTROLLED DOCUMENT

## BLOCK DIAGRAM



UNCONTROLLED DOCUMENT

\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN.= +DECIMAL PRECISION -0.00 MAX.= +0.00 -DECIMAL PRECISION

REV.

PART NUMBER

P4

LCM-H01602DSF43524

CUSTOM 16 X 2 LCD CHARACTER MODULE,  
GREEN LED BACKLIGHT, FLEX CABLE CONNECTOR.

## CONFIDENTIAL INFORMATION

THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF LUMEX INC. EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING BY LUMEX INC., THE HOLDER OF THIS DOCUMENT SHALL KEEP ALL INFORMATION CONTAINED HEREIN CONFIDENTIAL AND SHALL PROTECT SAME IN WHOLE OR IN PART FROM DISCLOSURE AND DISSEMINATION TO ALL THIRD PARTIES.

## RELIABILITY NOTE

OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.

**LUMEX**  
Creating LED and LCD Solutions Together™

290 E. HELEN ROAD  
PALATINE, IL 60067-6976  
PHONE: +1.847.359.2790  
US WEB: www.lumex.com  
TW WEB: www.lumex.com.tw

DRAWN BY:

JN

CHECKED BY:

APPROVED BY:

DATE: 06.05.09

PAGE: 3 OF 4

SCALE: N/A

## PIN CONFIGURATION

| PIN | SIGNAL    | DESCRIPTION                                                |
|-----|-----------|------------------------------------------------------------|
| 1   | GND       | GROUND                                                     |
| 2   | DB4 (I/O) | LOW ORDER DATA BIT                                         |
| 3   | DB5 (I/O) | DATA BIT                                                   |
| 4   | DB6 (I/O) | DATA BIT                                                   |
| 5   | DB7 (I/O) | HIGH ORDER DATA BIT, CAN BE USED AS BUSY FLAG              |
| 6   | RS (I)    | REGISTER SELECT INPUT                                      |
| 7   | R/W- (I)  | READ/WRITE MODE SELECT                                     |
| 8   | GND       | GROUND                                                     |
| 9   | E (I)     | START ENABLE SIGNAL TO READ OR WRITE THE DATA (STROBE)     |
| 10  | GND       | GROUND                                                     |
| 11  | VDD       | +5V - POWER TO CONTROLLER AND PULL RESISTORS               |
| 12  | VDD       | +5V - POWER TO CONTROLLER AND PULL RESISTORS               |
| 13  | GND       | GROUND                                                     |
| 14  | BL+ (I)   | CURRENT SOURCE FOR BACKLIGHT DIODES                        |
| 15  | VO (I)    | LCD DRIVE VOLTAGE                                          |
| 16  | LED1G (I) | 0 TO VDD. HIGH TURN ON GREEN PORTION OF LED 2 (TOP)        |
| 17  | LED1Y (I) | 0 TO VDD. HIGH TURN ON YELLOW PORTION OF LED 2 (TOP)       |
| 18  | LED2G (I) | 0 TO VDD. HIGH TURN ON GREEN PORTION OF LED 2 (MIDDLE)     |
| 19  | LED2Y (I) | 0 TO VDD. HIGH TURN ON YELLOW PORTION OF LED 2 (MIDDLE)    |
| 20  | LED3G (I) | 0 TO VDD. HIGH TURN ON GREEN PORTION OF LED 3 (BOTTOM)     |
| 21  | LED3Y (I) | 0 TO VDD. HIGH TURN ON YELLOW PORTION OF LED 3 (BOTTOM)    |
| 22  | PB1 (O)   | PULLED UPTO VDD ON MODULE. USE FOOTPRINT TO SHORT (TOP)    |
| 23  | PB2 (O)   | PULLED UPTO VDD ON MODULE. USE FOOTPRINT TO SHORT (BOTTOM) |
| 24  | GND       | GROUND                                                     |
| 25  | NC        | NO CONNECTION                                              |

## ELECTRICAL CHARACTERISTICS

16 x 2, 1/16 DUTY, 1/5 BIAS

| PARAMETER                              | SYMBOL     | STANDARD VALUE |      |          | TEST CONDITION                                                                                                                    | UNIT          |
|----------------------------------------|------------|----------------|------|----------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|
|                                        |            | MIN            | TYP. | MAX      |                                                                                                                                   |               |
| OPERATING VOLTAGE                      | $V_{DD}$   | 4.9            | 5.0  | 5.1      | -                                                                                                                                 | V             |
| LCD DRIVING VOLTAGE                    | $V_{LCD}$  | -              | 5.0  | -        | $V_{DD} - V_5$                                                                                                                    | V             |
| "H"LEVEL INPUT VOLTAGE                 | $V_{IH1}$  | 3.0            | -    | $V_{DD}$ | -                                                                                                                                 | V             |
| "L"LEVEL INPUT VOLTAGE                 | $V_{IL1}$  | -              | -    | 1.0      | -                                                                                                                                 | V             |
| "H"LEVEL OUTPUT VOLTAGE                | $V_{OH1}$  | 3.9            | -    | $V_{DD}$ | $I_{OH} = -0.1 \text{ mA}$                                                                                                        | V             |
| "L"LEVEL OUTPUT VOLTAGE                | $V_{OL1}$  | -              | -    | 0.4      | $I_{OL} = 0.1 \text{ mA}$                                                                                                         | V             |
| DRIVER VOLTAGE DESCENDING (COM)        | $V_{COMD}$ | -              | -    | 0.3      | $I_D = 5 \mu\text{A}$                                                                                                             | V             |
| DRIVER VOLTAGE DESCENDING (SEG)        | $V_{SEGD}$ | -              | -    | 0.3      | $I_D = 5 \mu\text{A}$                                                                                                             | V             |
| INPUT LEAKAGE CURRENT                  | $I_{IL}$   | -1             | -    | 1        | $V_{IN} = 0 \text{ TO } V_{DD}$                                                                                                   | $\mu\text{A}$ |
| PULL-UP MOS CURRENT                    | $-I_p$     | 30             | 75   | 150      | $V_{DD} = 3V$                                                                                                                     | $\mu\text{A}$ |
| SUPPLY CURRENT POWER<br>SUPPLY CURRENT | $I_{OP}$   | -              | 2.4  | 4        | RF OSCILLATION,<br>FROM EXTERNAL<br>CLOCK $V_{DD} = 3V$ ,<br>$F_{OSC} = F_{CP} = 540\text{KHZ}$ ,<br>INCLUDE LCD BIAS<br>CURRENT. | mA            |

## ABSOLUTE MAXIMUM

| CHARACTERISTIC        | SYMBOL                | VALUE                  | UNIT |
|-----------------------|-----------------------|------------------------|------|
| POWER SUPPLY VOLTAGE  | $V_{DD}$              | -0.3 TO +5.5           | V    |
| POWER SUPPLY VOLTAGE  | $V_1 \text{ TO } V_5$ | 0 TO $V_{DD} + 0.3$    | V    |
| INPUT VOLTAGE         | $V_I$                 | -0.3 TO $V_{DD} + 0.3$ | V    |
| OPERATING TEMPERATURE | TOPR                  | -20 TO +70             | °C   |
| STORAGE TEMPERATURE   | TSTG                  | -30 TO +80             | °C   |

\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN.= +DECIMAL PRECISION -0.00 MAX.= +0.00 -DECIMAL PRECISION

REV.

PART NUMBER

P4

LCM-H01602DSF43524

CUSTOM 16 X 2 LCD CHARACTER MODULE,  
GREEN LED BACKLIGHT, FLEX CABLE CONNECTOR.

## CONFIDENTIAL INFORMATION

THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF LUMEX INC. EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING BY LUMEX INC., THE HOLDER OF THIS DOCUMENT SHALL KEEP ALL INFORMATION CONTAINED HEREIN CONFIDENTIAL AND SHALL PROTECT SAME IN WHOLE OR IN PART FROM DISCLOSURE AND DISSEMINATION TO ALL THIRD PARTIES.

## RELIABILITY NOTE

OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.



290 E. HELEN ROAD  
PALATINE, IL 60067-6976  
PHONE: +1.847.359.2790  
US WEB: www.lumex.com  
TW WEB: www.lumex.com.tw

DRAWN BY:

CHECKED BY:

APPROVED BY:

DATE: 06.05.09

JN

PAGE: 4 OF 4

SCALE: N/A