



**MILITARY DATA SHEET**

**MNLMC6061-X REV 0AL**

Original Creation Date: 08/16/95  
Last Update Date: 08/16/95  
Last Major Revision Date: 08/16/95

**PRECISION CMOS DUAL MICROPOWER OPERATIONAL AMPLIFIER**

**Industry Part Number**

LMC6061

**NS Part Numbers**

LMC6061AMJ/883

**Prime Die**

LMC6061

Datasheet.Directory

**Processing**

MIL-STD-883, Method 5004

**Quality Conformance Inspection**

MIL-STD-883, Method 5005

**Subgrp Description Temp ( °C)**

|    |                     |      |
|----|---------------------|------|
| 1  | Static tests at     | +25  |
| 2  | Static tests at     | +125 |
| 3  | Static tests at     | -55  |
| 4  | Dynamic tests at    | +25  |
| 5  | Dynamic tests at    | +125 |
| 6  | Dynamic tests at    | -55  |
| 7  | Functional tests at | +25  |
| 8A | Functional tests at | +125 |
| 8B | Functional tests at | -55  |
| 9  | Switching tests at  | +25  |
| 10 | Switching tests at  | +125 |
| 11 | Switching tests at  | -55  |

## Electrical Characteristics

### DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC:  $V_+ = 5V$ ,  $V_{cm} = 1.5$ ,  $V_- = 0V$ ,  $V_o = 2.5V$ ,  $R_l > 1M$

| SYMBOL                             | PARAMETER                             | CONDITIONS                                 | NOTES | PIN-NAME | MIN    | MAX  | UNIT | SUB-GROUPS |
|------------------------------------|---------------------------------------|--|-------|----------|--------|------|------|------------|
| Vio                                | Input Offset Voltage                  |  |       |          | 350    |      | uV   | 1          |
|                                    |                                       |  |       |          | 750    |      | uV   | 2, 3       |
| Iib                                | Input Bias Current                    |  |       |          | 25     |      | pA   | 1          |
|                                    |                                       |  |       |          | 100    |      | pA   | 2, 3       |
| Iio                                | Input Offset Current                  |  |       |          | 25     |      | pA   | 1          |
|                                    |                                       |  |       |          | 100    |      | pA   | 2, 3       |
| CMRR                               | Common Mode Rejection Ratio           | $0V \leq V_{cm} \leq 12.0V$ , $V_+ = 15V$  |       |          | 75     |      | dB   | 1          |
|                                    |                                       |  |       |          | 70     |      | dB   | 2, 3       |
| +PSRR                              | Positive Power Supply Rejection Ratio | $5V \leq V_+ \leq 15V$ , $V_o = 2.5V$      |       |          | 75     |      | dB   | 1          |
|                                    |                                       |  |       |          | 70     |      | dB   | 2, 3       |
| -PSRR                              | Negative Power Supply Rejection Ratio | $-10V \leq V_- \leq 0V$ , $V_o = 2.5V$     |       |          | 84     |      | dB   | 1          |
|                                    |                                       |  |       |          | 70     |      | dB   | 2, 3       |
| Vcm                                | Input Common-Mode Voltage Range       | $V_+ = 5V$ and $15V$ for $CMRR \geq 60$ dB |       |          | V+-2.3 | -0.1 | V    | 1          |
|                                    |                                       |  |       |          | V+-2.6 | 0    | V    | 2, 3       |
| Io                                 | Output Current                        | Sourcing, $V_o = 0V$                       |       |          | 16     |      | mA   | 1          |
|                                    |                                       |  |       |          | 8      |      | mA   | 2, 3       |
|                                    |                                       | Sinking, $V_o = 5V$                        |       |          | 16     |      | mA   | 1          |
|                                    |                                       |  |       |          | 7      |      | mA   | 2, 3       |
|                                    |                                       | $V_+ = 15V$ , Sourcing, $V_o = 0V$         |       |          | 15     |      | mA   | 1          |
|                                    |                                       |  |       |          | 9      |      | mA   | 2, 3       |
| $V_+ = 15V$ , Sinking, $V_o = 13V$ |                                       |  | 1     |          | 24     |      | mA   | 1          |
|                                    |                                       |  | 1     |          | 7      |      | mA   | 2, 3       |
| Icc                                | Supply Current                        | $V_+ = +5V$ , $V_o = 1.5V$                 |       |          |        | 24   | uA   | 1          |
|                                    |                                       |  |       |          |        | 35   | uA   | 2, 3       |
|                                    |                                       | $V_+ = +15V$ , $V_o = 7.5V$                |       |          |        | 30   | uA   | 1          |
|                                    |                                       |  |       |          |        | 40   | uA   | 2, 3       |

## Electrical Characteristics

### DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)  
DC:  $V_+ = 5V$ ,  $V_{cm} = 1.5$ ,  $V_- = 0V$ ,  $V_o = 2.5V$ ,  $R_l > 1M$

| SYMBOL                              | PARAMETER                 | CONDITIONS                  | NOTES        | PIN-NAME                  | MIN    | MAX  | UNIT  | SUB-GROUPS |   |      |
|-------------------------------------|---------------------------|-----------------------------|--------------|---------------------------|--------|------|-------|------------|---|------|
| Avs                                 | Large Signal Voltage Gain | $R_l = 100K$ Ohms, Sourcing | 2            |                           | 400    |      | V/mV  | 4          |   |      |
|                                     |                           |                             | 2            |                           | 200    |      | V/mV  | 5, 6       |   |      |
|                                     |                           | $R_l = 100K$ Ohms, Sinking  | 2            |                           | 180    |      | V/mV  | 4          |   |      |
|                                     |                           |                             | 2            |                           | 70     |      | V/mV  | 5, 6       |   |      |
|                                     |                           | $R_l = 25 K$ Ohms, Sourcing | 2            |                           | 400    |      | V/mV  | 4          |   |      |
|                                     |                           |                             | 2            |                           | 150    |      | V/mV  | 5, 6       |   |      |
|                                     |                           | $R_l = 25 K$ Ohms, Sinking  | 2            |                           | 100    |      | V/mV  | 4          |   |      |
|                                     |                           |                             | 2            |                           | 35     |      | V/mV  | 5, 6       |   |      |
|                                     |                           | Vop                         | Output Swing | $R_l = 100K$ Ohms to 2.5V |        |      | 4.990 | .010       | V | 4    |
|                                     |                           |                             |              |                           |        |      | 4.970 | .030       | V | 5, 6 |
| $R_l = 25K$ Ohms to 2.5V            |                           |                             |              |                           | 4.975  | .020 | V     | 4          |   |      |
|                                     |                           |                             |              |                           | 4.955  | .045 | V     | 5, 6       |   |      |
| $V_+ = 15V$ $R_l=100K$ Ohms to 7.5V |                           |                             |              |                           | 14.975 | .025 | V     | 1          |   |      |
|                                     |                           |                             |              |                           | 14.955 | .050 | V     | 2, 3       |   |      |
| $V_+ = 15V$ $R_l=25K$ Ohms to 7.5V  |                           |                             |              |                           | 14.900 | .050 | V     | 1          |   |      |
|                                     |                           |                             |              |                           | 14.800 | .200 | V     | 2, 3       |   |      |

### AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)  
AC:  $V_+ = 5V$ ,  $V_{cm} = 1.5$ ,  $V_- = 0V$ ,  $V_o = 2.5V$ ,  $R_l > 1M$

|     |                |             |   |  |    |  |      |        |
|-----|----------------|-------------|---|--|----|--|------|--------|
| Sr  | Slew Rate      | $V_+ = 15V$ | 3 |  | 20 |  | V/mS | 7      |
|     |                |             | 3 |  | 8  |  | V/mS | 8A, 8B |
| Gbw | Gain-Bandwidth |             |   |  | 80 |  | KHz  | 7      |
|     |                |             |   |  | 75 |  | KHz  | 8A, 8B |

Note 1: Do not short circuit output to  $V_+$ , when  $V_+$  is greater than 13V or reliability will be adversely affected.

Note 2:  $V_+=15V, V_{cm}=7.5V$  and  $R_l$  connected to 7.5V. For Sourcing tests,  $7.5V \leq V_o \leq 11.5V$ . For Sinking tests,  $2.5V \leq V_o \leq 7.5V$ .

Note 3: Configure for voltage follower, 0 to 10V input step. For +Slew, is measured between 5.5V and 8.0V. For -Slew, is measured between 6.0V and 3.5V.

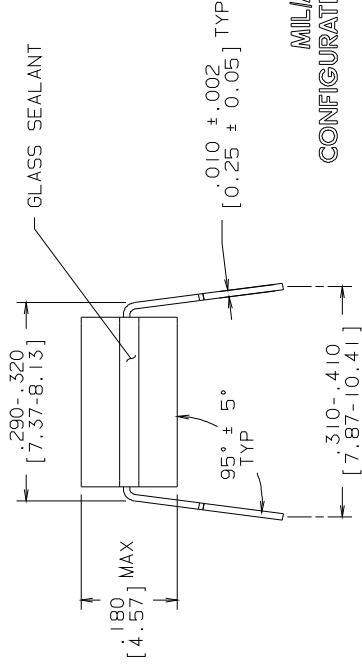
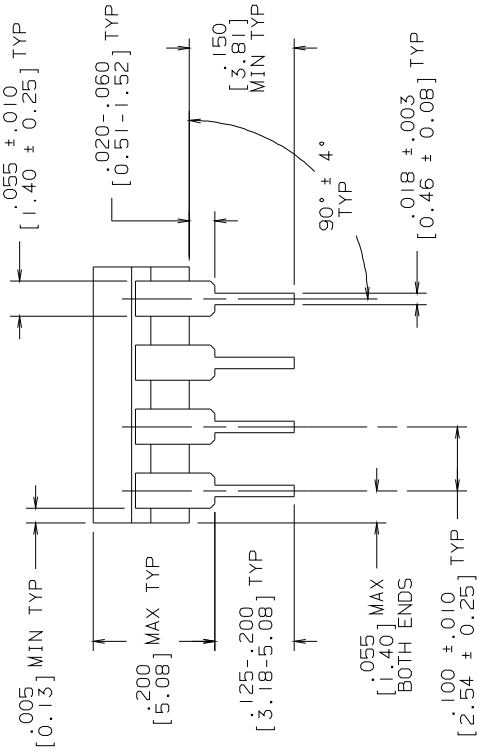
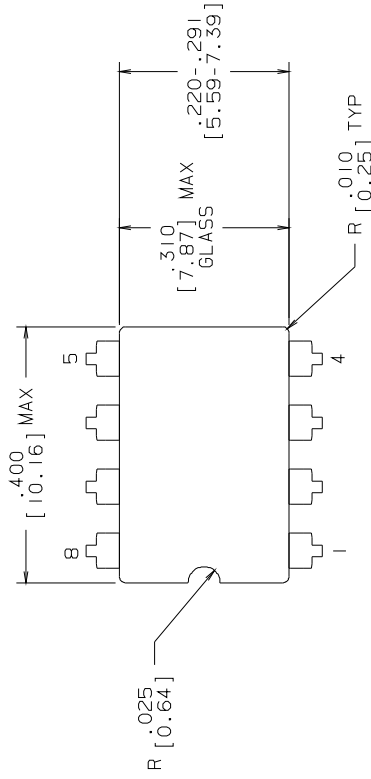
### Graphics and Diagrams

| GRAPHICS# | DESCRIPTION                  |
|-----------|------------------------------|
| 06275HR   | (blank)                      |
| J08ARL    | CERDIP (J), 8 LEAD (P/P DWG) |

See attached graphics following this page.

REV I S I O N S

| LTR | DESCRIPTION                    | E. C. N. | DATE     | BY/APP'D |
|-----|--------------------------------|----------|----------|----------|
| L   | REVISE PER CURRENT STD; REDRAW | 10002    | 09/21/93 | TL/      |



MILIAERO  
 CONFIGURATION CONTROL  
 MIL-M-38510  
 CONFIGURATION CONTROL

CONTROLLING DIMENSION: INCH

| APPROVALS               | DATE     | NATIONAL SEMICONDUCTOR CORPORATION                   |
|-------------------------|----------|--|
| DRAWN <i>T. LEQUANG</i> | 09/21/93 | 2900 Semiconductor Drive, Santa Clara, CA 95052-8090 |
| DFTG. CHK.              |          |  |
| ENGR. CHK.              |          |  |
| APPROVAL                |          |  |

CERDIP (J),  
 8 LEAD

| PROJECTION | SCALE                | SIZE  | DRAWING NUMBER | REV |
|------------|----------------------|-------|----------------|-----|
|            | N/A                  | B     | MKT-J08A       | L   |
|            | DO NOT SCALE DRAWING | SHEET | OF             | I   |

NOTES: UNLESS OTHERWISE SPECIFIED

- LEAD FINISH TO BE 200 MICROMETERS / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
- JEDEC REGISTRATION MO-036, VARIATION AA, DATED 04/1981.