

## Dual 4-5-Input OR/NOR Gate

The MC10H109 is a dual 4–5–input OR/NOR gate. This MECL 10H part is a functional/pinout duplication of the standard MECL 10K family part, with 100% improvement in propagation delay, and no increase in power–supply current.

- Propagation Delay, 1.0 ns Typical
- Power Dissipation 35 mW/Gate Typical (same as MECL 10K)
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K–Compatible

### MAXIMUM RATINGS

| Characteristic                                  | Symbol    | Rating                     | Unit     |
|---|-----------|----------------------------|----------|
| Power Supply ( $V_{CC} = 0$ )                   | $V_{EE}$  | –8.0 to 0                  | Vdc      |
| Input Voltage ( $V_{CC} = 0$ )                  | $V_I$     | 0 to $V_{EE}$              | Vdc      |
| Output Current— Continuous<br>— Surge           | $I_{out}$ | 50<br>100                  | mA       |
| Operating Temperature Range                     | $T_A$     | 0 to +75                   | °C       |
| Storage Temperature Range— Plastic<br>— Ceramic | $T_{stg}$ | –55 to +150<br>–55 to +165 | °C<br>°C |

### ELECTRICAL CHARACTERISTICS ( $V_{EE} = -5.2 \text{ V} \pm 5\%$ ) (See Note)

| Characteristic       | Symbol    | 0°    |       | 25°   |       | 75°   |        | Unit |
|----------------------|-----------|-------|-------|-------|-------|-------|--------|------|
|                      |           | Min   | Max   | Min   | Max   | Min   | Max    |      |
| Power Supply Current | $I_E$     | —     | 15    | —     | 14    | —     | 15     | mA   |
| Input Current High   | $I_{inH}$ | —     | 425   | —     | 265   | —     | 265    | μA   |
| Input Current Low    | $I_{inL}$ | 0.5   | —     | 0.5   | —     | 0.3   | —      | μA   |
| High Output Voltage  | $V_{OH}$  | –1.02 | –0.84 | –0.98 | –0.81 | –0.92 | –0.735 | Vdc  |
| Low Output Voltage   | $V_{OL}$  | –1.95 | –1.63 | –1.95 | –1.63 | –1.95 | –1.60  | Vdc  |
| High Input Voltage   | $V_{IH}$  | –1.17 | –0.84 | –1.13 | –0.81 | –1.07 | –0.735 | Vdc  |
| Low Input Voltage    | $V_{IL}$  | –1.95 | –1.48 | –1.95 | –1.48 | –1.95 | –1.45  | Vdc  |

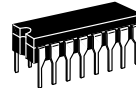
### AC PARAMETERS

| Characteristic    | Symbol   | 0.4 | 1.3 | 0.4 | 1.3 | 0.45 | 1.45 | ns |
|-------------------|----------|-----|-----|-----|-----|------|------|----|
| Propagation Delay | $t_{pd}$ |     |     |     |     |      |      |    |
| Rise Time         | $t_r$    | 0.5 | 2.0 | 0.5 | 2.1 | 0.5  | 2.2  | ns |
| Fall Time         | $t_f$    | 0.5 | 2.0 | 0.5 | 2.1 | 0.5  | 2.2  | ns |

#### NOTE:

Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfm is maintained. Outputs are terminated through a 50–ohm resistor to –2.0 volts.

## MC10H109



**L SUFFIX**  
CERAMIC PACKAGE  
CASE 620–10

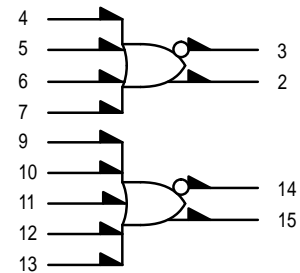


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648–08



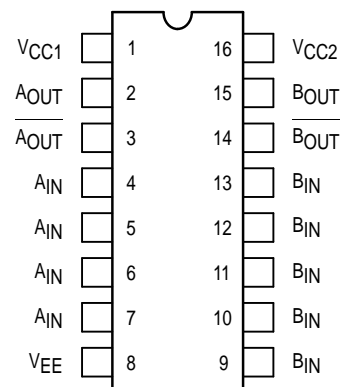
**FN SUFFIX**  
PLCC  
CASE 775–02

### LOGIC DIAGRAM



$V_{CC1} = \text{PIN } 1$   
 $V_{CC2} = \text{PIN } 16$   
 $V_{EE} = \text{PIN } 8$

### DIP PIN ASSIGNMENT

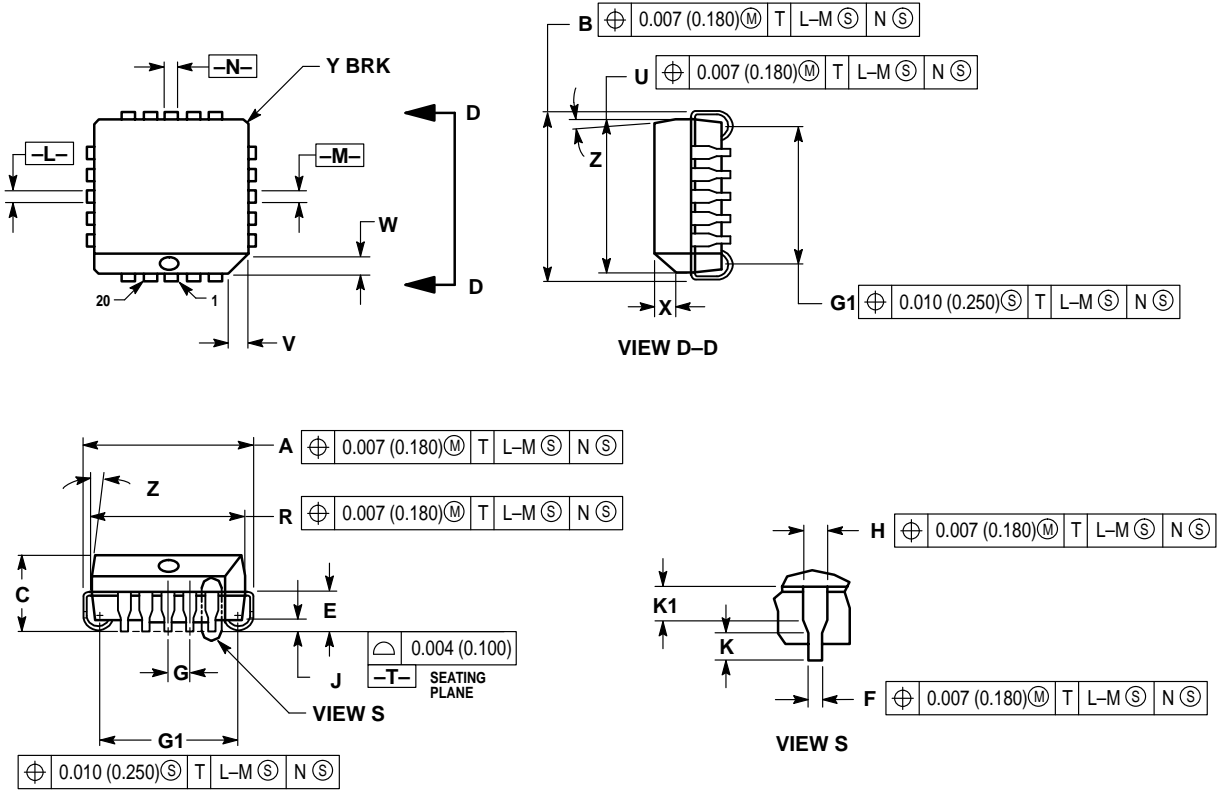


Pin assignment is for Dual–in–Line Package.  
For PLCC pin assignment, see the Pin Conversion  
Tables on page 6–11 of the Motorola MECL Data  
Book (DL122/D).



OUTLINE DIMENSIONS

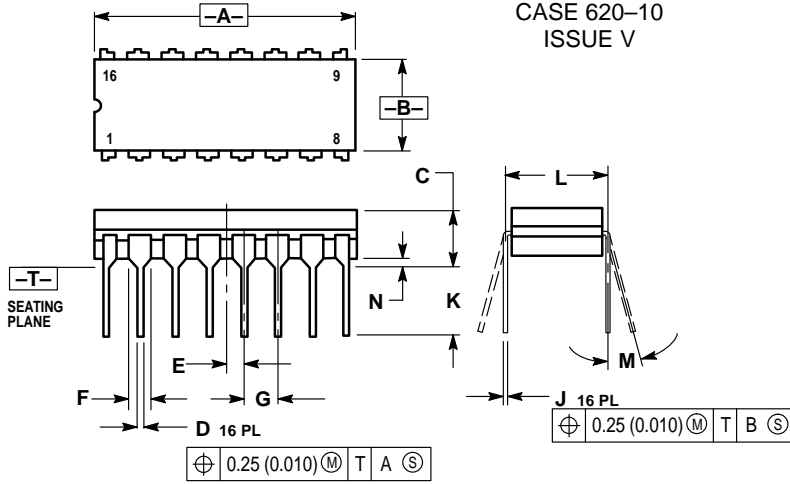
FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C



- NOTES:
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
  - DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
  - DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
  - DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  - CONTROLLING DIMENSION: INCH.
  - THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
  - DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

OUTLINE DIMENSIONS

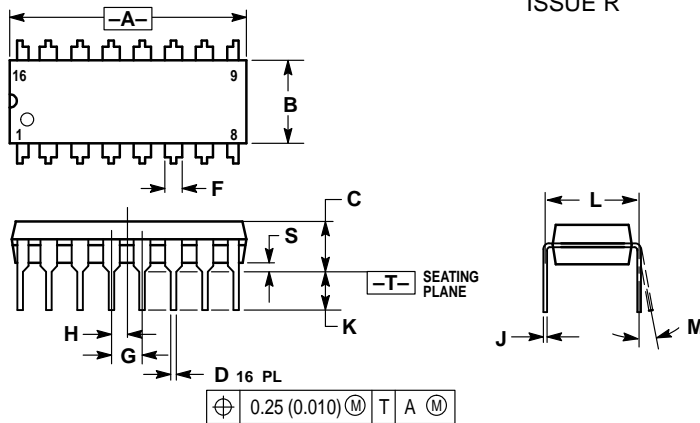
L SUFFIX  
CERAMIC DIP PACKAGE  
CASE 620-10  
ISSUE V



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
  4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.750     | 0.785 | 19.05       | 19.93 |
| B   | 0.240     | 0.295 | 6.10        | 7.49  |
| C   | —         | 0.200 | —           | 5.08  |
| D   | 0.015     | 0.020 | 0.39        | 0.50  |
| E   | 0.050 BSC |       | 1.27 BSC    |       |
| F   | 0.055     | 0.065 | 1.40        | 1.65  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.125     | 0.170 | 3.18        | 4.31  |
| L   | 0.300 BSC |       | 7.62 BSC    |       |
| M   | 0°        |       | 15°         |       |
| N   | 0.020     | 0.040 | 0.51        | 1.01  |

P SUFFIX  
PLASTIC DIP PACKAGE  
CASE 648-08  
ISSUE R



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
  4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
  5. ROUNDED CORNERS OPTIONAL.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.740     | 0.770 | 18.80       | 19.55 |
| B   | 0.250     | 0.270 | 6.35        | 6.85  |
| C   | 0.145     | 0.175 | 3.69        | 4.44  |
| D   | 0.015     | 0.021 | 0.39        | 0.53  |
| F   | 0.040     | 0.70  | 1.02        | 1.77  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.050 BSC |       | 1.27 BSC    |       |
| J   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.110     | 0.130 | 2.80        | 3.30  |
| L   | 0.295     | 0.305 | 7.50        | 7.74  |
| M   | 0°        |       | 10°         |       |
| S   | 0.020     | 0.040 | 0.51        | 1.01  |

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