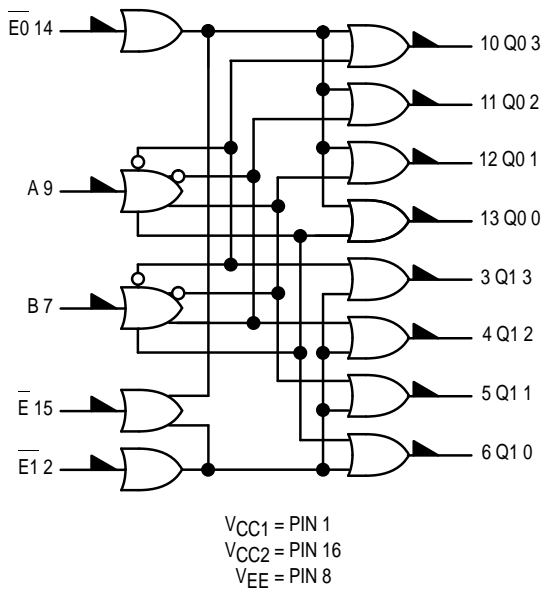


# Dual Binary to 1-4 Decoder (Low)

The MC10171 is a binary coded 2 line to dual 4 line decoder with selected outputs low. With either E0 or E1 high, the corresponding selected 4 outputs are high. The common enable E, when high, forces all outputs high.

$P_D = 325 \text{ mW typ/pkg (No Load)}$   
 $t_{pd} = 4.0 \text{ ns typ}$   
 $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$

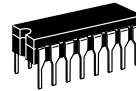
**LOGIC DIAGRAM**



**TRUTH TABLE**

| ENABLE INPUTS |    |    | INPUTS |   | OUTPUTS |     |     |     |     |     |     |     |
|---------------|----|----|--------|---|---------|-----|-----|-----|-----|-----|-----|-----|
| E             | E0 | E1 | A      | B | Q10     | Q11 | Q12 | Q13 | Q00 | Q01 | Q02 | Q03 |
| L             | L  | L  | L      | L | L       | H   | H   | H   | L   | H   | H   | H   |
| L             | L  | L  | L      | H | H       | L   | H   | H   | H   | L   | H   | H   |
| L             | L  | L  | H      | L | H       | H   | L   | H   | H   | L   | H   | H   |
| L             | L  | L  | H      | H | H       | H   | H   | L   | H   | H   | H   | L   |
| L             | L  | H  | L      | L | H       | H   | H   | H   | L   | H   | H   | H   |
| L             | H  | L  | L      | L | L       | H   | H   | H   | H   | H   | H   | H   |
| H             | X  | X  | X      | X | H       | H   | H   | H   | H   | H   | H   | H   |

## MC10171



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

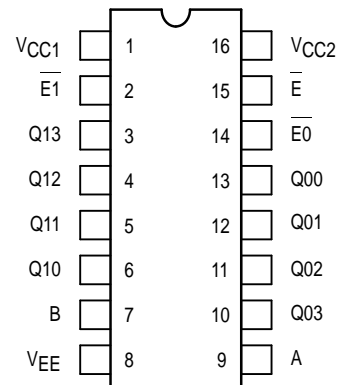


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



**FN SUFFIX**  
PLCC  
CASE 775-02

**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).



MC10171

ELECTRICAL CHARACTERISTICS

| Characteristic                     | Symbol      | Pin Under Test | Test Limits |        |        |     |        |        |        | Unit      |
|------------------------------------|-------------|----------------|-------------|--------|--------|-----|--------|--------|--------|-----------|
|                                    |             |                | -30°C       |        | +25°C  |     |        | +85°C  |        |           |
|                                    |             |                | Min         | Max    | Min    | Typ | Max    | Min    | Max    |           |
| Power Supply Drain Current         | $I_E$       | 8              |             | 85     |        | 65  | 77     |        | 85     | mAdc      |
| Input Current                      | $I_{inH}$   | 14             |             | 350    |        |     | 220    |        | 220    | $\mu$ Adc |
|                                    | $I_{inL}$   | 14             | 0.5         |        | 0.5    |     |        | 0.3    |        | $\mu$ Adc |
| Output Voltage Logic 1             | $V_{OH}$    | 6              | -1.060      | -0.890 | -0.960 |     | -0.810 | -0.890 | -0.700 | Vdc       |
|                                    |             | 13             | -1.060      | -0.890 | -0.960 |     | -0.810 | -0.890 | -0.700 | Vdc       |
| Output Voltage Logic 0             | $V_{OL}$    | 13             | -1.890      | -1.675 | -1.850 |     | -1.650 | -1.825 | -1.615 | Vdc       |
| Threshold Voltage Logic 1          | $V_{OHA}$   | 6              | -1.080      |        | -0.980 |     |        | -0.910 |        | Vdc       |
|                                    |             | 13             | -1.080      |        | -0.980 |     |        | -0.910 |        | Vdc       |
| Threshold Voltage Logic 0          | $V_{OLA}$   | 6              |             | -1.655 |        |     | -1.630 |        | -1.595 | Vdc       |
|                                    |             | 13             |             | -1.655 |        |     | -1.630 |        | -1.595 | Vdc       |
| Switching Times (50 $\Omega$ Load) |             |                |             |        |        |     |        |        |        | ns        |
| Propagation Delay                  | $t_{7+6+}$  | 6              | 1.5         | 6.2    | 1.5    | 4.0 | 6.0    | 1.5    | 6.4    |           |
|                                    | $t_{7-6-}$  | 6              | 1.5         | 6.2    | 1.5    | 4.0 | 6.0    | 1.5    | 6.4    |           |
|                                    | $t_{7+13+}$ | 13             | 1.5         | 6.2    | 1.5    | 4.0 | 6.0    | 1.5    | 6.4    |           |
|                                    | $t_{7-13-}$ | 13             | 1.5         | 6.2    | 1.5    | 4.0 | 6.0    | 1.5    | 6.4    |           |
| Rise Time (20 to 80%)              | $t_{6+}$    | 6              | 1.0         | 3.3    | 1.1    | 2.0 | 3.3    | 1.1    | 3.4    |           |
|                                    | $t_{13+}$   | 13             | 1.0         | 3.3    | 1.1    | 2.0 | 3.3    | 1.1    | 3.4    |           |
| Fall Time (20 to 80%)              | $t_{6-}$    | 6              | 1.0         | 3.3    | 1.1    | 2.0 | 3.3    | 1.1    | 3.4    |           |
|                                    | $t_{13-}$   | 13             | 1.0         | 3.3    | 1.1    | 2.0 | 3.3    | 1.1    | 3.4    |           |

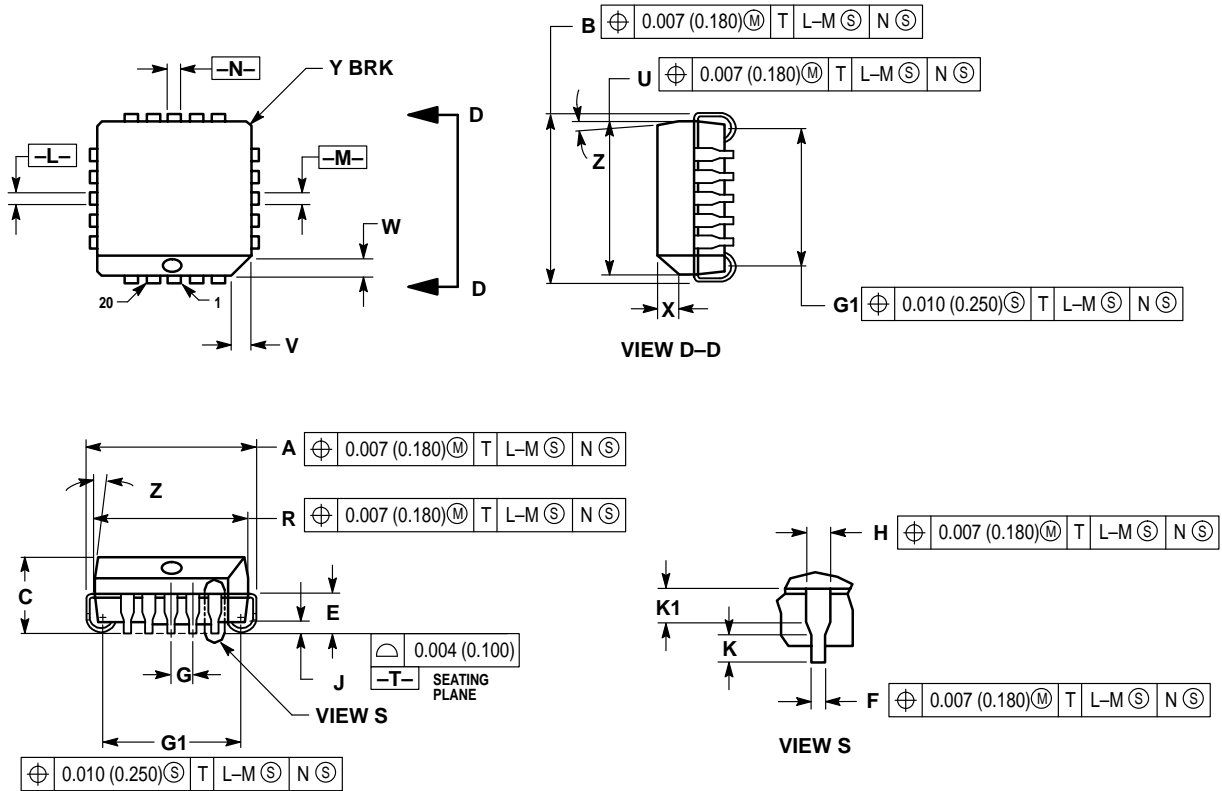
## ELECTRICAL CHARACTERISTICS (continued)

|                            |                    |                | TEST VOLTAGE VALUES (Volts)               |                    |                     |                     |                 |                           |
|----------------------------|--------------------|----------------|---|--------------------|---------------------|---------------------|-----------------|---------------------------|
|                            |                    |                | V <sub>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmax</sub> | V <sub>EE</sub> |                           |
| @ Test Temperature         |                    |                |   |                    |                     |                     |                 |                           |
| -30°C                      |                    |                | -0.890                                    | -1.890             | -1.205              | -1.500              | -5.2            |                           |
| +25°C                      |                    |                | -0.810                                    | -1.850             | -1.105              | -1.475              | -5.2            |                           |
| +85°C                      |                    |                | -0.700                                    | -1.825             | -1.035              | -1.440              | -5.2            |                           |
| Characteristic             | Symbol             | Pin Under Test | TEST VOLTAGE APPLIED TO PINS LISTED BELOW |                    |                     |                     |                 | (V <sub>CC</sub> )<br>Gnd |
|                            |                    |                | V <sub>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmax</sub> | V <sub>EE</sub> |                           |
| Power Supply Drain Current | I <sub>E</sub>     | 8              | 2,7,9,14,15                               |                    |                     |                     | 8               | 1, 16                     |
| Input Current              | I <sub>inH</sub>   | 14             | 14  |                    |                     |                     | 8               | 1, 16                     |
|                            | I <sub>inL</sub>   | 14             |   | 14                 |                     |                     | 8               | 1, 16                     |
| Output Voltage Logic 1     | V <sub>OH</sub>    | 6              | 15  |                    |                     |                     | 8               | 1, 16                     |
|                            |                    | 13             | 15  |                    |                     |                     | 8               | 1, 16                     |
| Output Voltage Logic 0     | V <sub>OL</sub>    | 13             |   | 2,7,9,14,15        |                     |                     | 8               | 1, 16                     |
| Threshold Voltage Logic 1  | V <sub>OHA</sub>   | 6              |   |                    | 15                  |                     | 8               | 1, 16                     |
|                            |                    | 13             |   |                    | 15                  |                     | 8               | 1, 16                     |
| Threshold Voltage Logic 0  | V <sub>OLA</sub>   | 6              |   | 2,9,14,15          |                     | 7                   | 8               | 1, 16                     |
|                            |                    | 13             |   | 2,7,14,15          |                     | 9                   | 8               | 1, 16                     |
| Switching Times (50Ω Load) |                    |                |   | +0.31V             | Pulse In            | Pulse Out           | -3.2 V          | +2.0 V                    |
| Propagation Delay          | t <sub>7+6+</sub>  | 6              |   | 2,9,14,15          | 7                   | 6                   | 8               | 1, 16                     |
|                            | t <sub>7-6-</sub>  | 6              |   | 2,9,14,15          | 7                   | 6                   | 8               | 1, 16                     |
|                            | t <sub>7+13+</sub> | 13             |   | 2,9,14,15          | 7                   | 13                  | 8               | 1, 16                     |
|                            | t <sub>7-13-</sub> | 13             |   | 2,9,14,15          | 7                   | 13                  | 8               | 1, 16                     |
| Rise Time (20 to 80%)      | t <sub>6+</sub>    | 6              |   |                    | 7                   | 6                   | 8               | 1, 16                     |
|                            | t <sub>13+</sub>   | 13             |   |                    | 7                   | 13                  | 8               | 1, 16                     |
| Fall Time (20 to 80%)      | t <sub>6-</sub>    | 6              |   |                    | 7                   | 6                   | 8               | 1, 16                     |
|                            | t <sub>13-</sub>   | 13             |   |                    | 7                   | 13                  | 8               | 1, 16                     |

Each MECL 10,000 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 linear fpm is maintained. Outputs are terminated through a 50-ohm resistor to -2.0 volts. Test procedures are shown for only one gate. The other gates are tested in the same manner.

OUTLINE DIMENSIONS

FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C

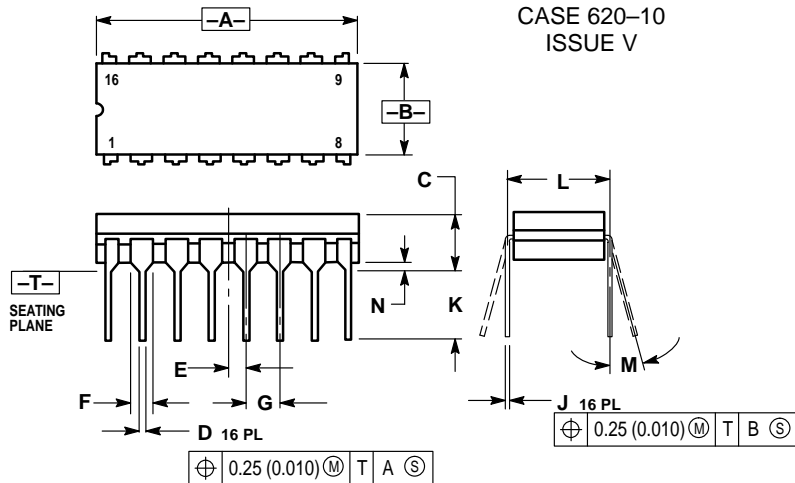


- NOTES:
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
  - DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
  - DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
  - DIMENSIONING 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).

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.385     | 0.395 | 9.78        | 10.03 |
| B   | 0.385     | 0.395 | 9.78        | 10.03 |
| C   | 0.165     | 0.180 | 4.20        | 4.57  |
| E   | 0.090     | 0.110 | 2.29        | 2.79  |
| F   | 0.013     | 0.019 | 0.33        | 0.48  |
| G   | 0.050 BSC |       | 1.27 BSC    |       |
| H   | 0.026     | 0.032 | 0.66        | 0.81  |
| J   | 0.020     | —     | 0.51        | —     |
| K   | 0.025     | —     | 0.64        | —     |
| R   | 0.350     | 0.356 | 8.89        | 9.04  |
| U   | 0.350     | 0.356 | 8.89        | 9.04  |
| V   | 0.042     | 0.048 | 1.07        | 1.21  |
| W   | 0.042     | 0.048 | 1.07        | 1.21  |
| X   | 0.042     | 0.056 | 1.07        | 1.42  |
| Y   | —         | 0.020 | —           | 0.50  |
| Z   | 2° 10°    |       | 2° 10°      |       |
| G1  | 0.310     | 0.330 | 7.88        | 8.38  |
| K1  | 0.040     | —     | 1.02        | —     |

OUTLINE DIMENSIONS

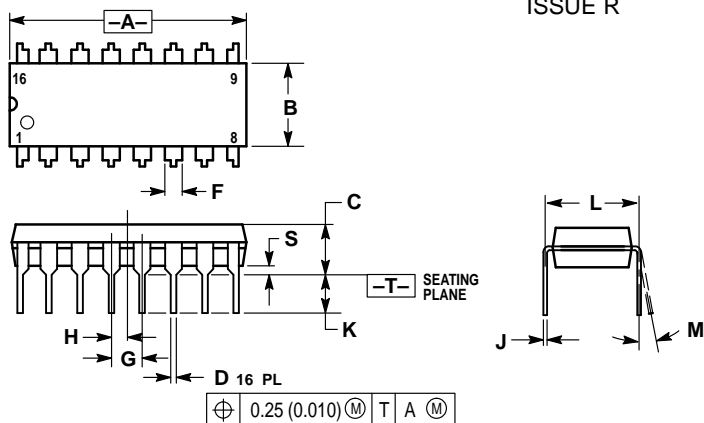
L SUFFIX  
CERAMIC DIP PACKAGE  
CASE 620-10  
ISSUE V



- 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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