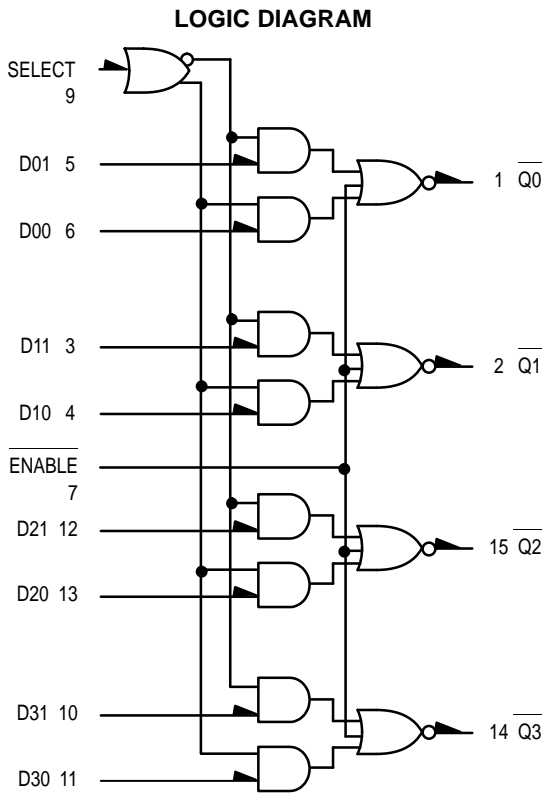


# Quad 2-Input Multiplexer (Inverting)

The MC10159 is a quad two channel multiplexer with enable. It incorporates common enable and common data select inputs. The select input determines which data inputs are enabled. A high (H) level enables data inputs D00, D10, D20, and D30. A low (L) level enables data inputs D01, D11, D21, and D31. Any change on the data inputs will be reflected at the outputs while the enable is low. Input levels are inverted at the output.

$P_D = 218 \text{ mW typ/pkg (No Load)}$   
 $t_{pd} = 2.5 \text{ ns typ (Data to Q)}$   
 $3.2 \text{ ns typ (Select to Q)}$   
 $t_r, t_f = 2.5 \text{ ns typ (20\%–80\%)}$

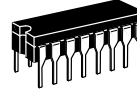


**TRUTH TABLE**

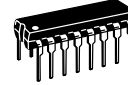
| Enable | Select | D0 | D1 | Q |
|--------|--------|----|----|---|
| L      | L      | X  | L  | H |
| L      | L      | X  | H  | L |
| L      | H      | L  | X  | H |
| L      | H      | H  | X  | L |
| H      | X      | X  | X  | L |

$V_{CC} = \text{PIN 16}$   
 $V_{EE} = \text{PIN 8}$

## MC10159



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

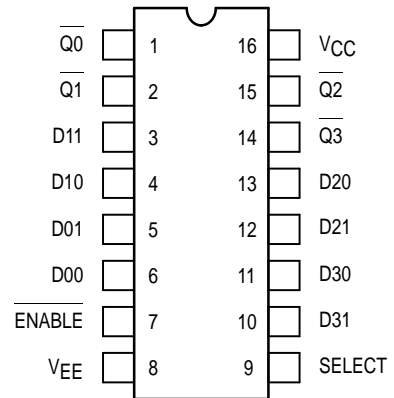


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



**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).



**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 <sub>E</sub>   | 8                 |             | 58     |        | 42     | 53  |        | 58     | mAdc   |     |
| Input Current              | I <sub>inH</sub> | 9                 |             | 360    |        |        | 225 |        | 225    | μAdc   |     |
|                            |                  | 5                 |             | 400    |        |        | 250 |        | 250    |        |     |
|                            | I <sub>inL</sub> | 5                 | 0.5         |        | 0.5    |        |     | 0.3    |        | μAdc   |     |
| Output Voltage             | Logic 1          | V <sub>OH</sub>   | 1           | -1.060 | -0.890 | -0.960 |     | -0.810 | -0.890 | -0.700 | Vdc |
| Output Voltage             | Logic 0          | V <sub>OL</sub>   | 1           | -1.890 | -1.675 | -1.850 |     | -1.650 | -1.825 | -1.615 | Vdc |
| Threshold Voltage          | Logic 1          | V <sub>OHA</sub>  | 1           | -1.080 |        | -0.980 |     |        | -0.910 |        | Vdc |
| Threshold Voltage          | Logic 0          | V <sub>OLA</sub>  | 1           |        | -1.655 |        |     | -1.630 |        | -1.595 | Vdc |
| Switching Times (50Ω Load) |                  |                   |             |        |        |        |     |        |        | ns     |     |
| Propagation Delay          | Data Input       | t <sub>5+1-</sub> | 1           | 1.1    | 3.8    | 1.2    | 2.5 | 3.3    | 1.1    | 3.8    |     |
|                            | Select Input     | t <sub>9+1-</sub> | 1           | 1.5    | 5.3    | 1.5    | 3.2 | 5.0    | 1.5    | 5.3    |     |
|                            | Enable Input     | t <sub>7+1-</sub> | 1           | 1.4    | 5.3    | 1.5    | 2.5 | 5.0    | 1.4    | 5.3    |     |
| Rise Time (20 to 80%)      |                  | t <sub>1+</sub>   | 1           | 1.0    | 3.7    | 1.1    | 2.5 | 3.5    | 1.0    | 3.7    |     |
| Fall Time (20 to 80%)      |                  | t <sub>1-</sub>   | 1           | 1.0    | 3.7    | 1.1    | 2.5 | 3.5    | 1.0    | 3.7    |     |

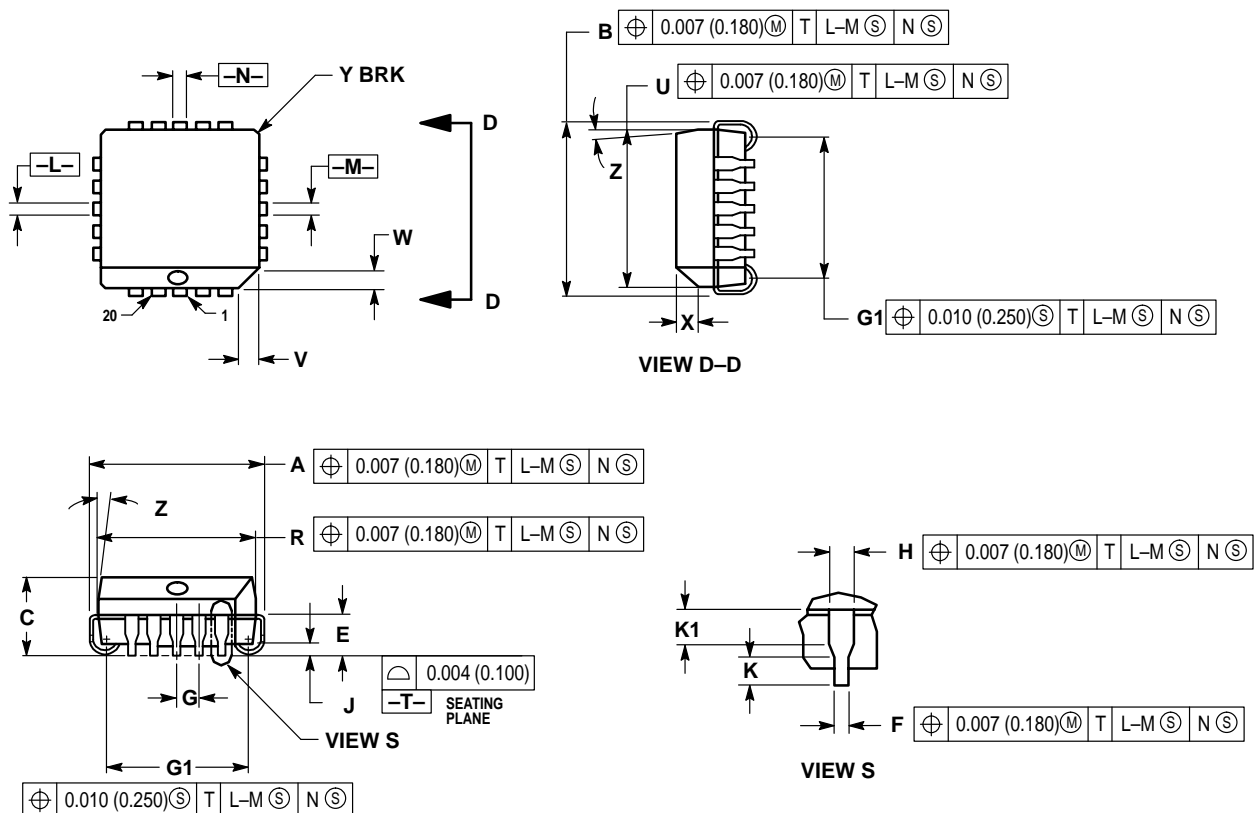
**ELECTRICAL CHARACTERISTICS (continued)**

|                            |                  |                   | TEST VOLTAGE VALUES (Volts)               |                    |                     |                    |                  | (V <sub>CC</sub> )<br>Gnd |        |
|----------------------------|------------------|-------------------|---|--------------------|---------------------|--------------------|------------------|---------------------------|--------|
|                            |                  |                   | V <sub>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmx</sub> | V <sub>VEE</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>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmx</sub> | V <sub>VEE</sub> |                           |        |
| Power Supply Drain Current | I <sub>E</sub>   | 8                 |   |                    |                     |                    | 8                | 16                        |        |
| Input Current              | I <sub>inH</sub> | 9                 | 9   |                    |                     |                    | 8                | 16                        |        |
|                            |                  | 5                 | 5   |                    |                     |                    | 8                | 16                        |        |
|                            | I <sub>inL</sub> | 5                 |   | 5                  |                     |                    | 8                | 16                        |        |
| Output Voltage             | Logic 1          | V <sub>OH</sub>   | 1   |                    |                     |                    | 8                | 16                        |        |
| Output Voltage             | Logic 0          | V <sub>OL</sub>   | 1   | 5                  |                     |                    | 8                | 16                        |        |
| Threshold Voltage          | Logic 1          | V <sub>OHA</sub>  | 1   | 9                  |                     | 6                  | 8                | 16                        |        |
| Threshold Voltage          | Logic 0          | V <sub>OLA</sub>  | 1   | 9                  |                     | 6                  | 8                | 16                        |        |
| Switching Times (50Ω Load) |                  |                   |   |                    |                     |                    |                  |                           |        |
| Propagation Delay          | Data Input       | t <sub>5+1-</sub> | 1   | +1.11V             | +0.31V              | Pulse In           | Pulse Out        | -3.2 V                    | +2.0 V |
|                            | Select Input     | t <sub>9+1-</sub> | 1   |                    |                     | 5                  | 1                | 8                         | 16     |
|                            | Enable Input     | t <sub>7+1-</sub> | 1   |                    |                     | 9                  | 1                | 8                         | 16     |
| Rise Time (20 to 80%)      |                  | t <sub>1+</sub>   | 1   | 3, 12              |                     | 7                  | 1                | 8                         | 16     |
| Fall Time (20 to 80%)      |                  | t <sub>1-</sub>   | 1   | 9                  |                     | 5                  | 1                | 8                         | 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



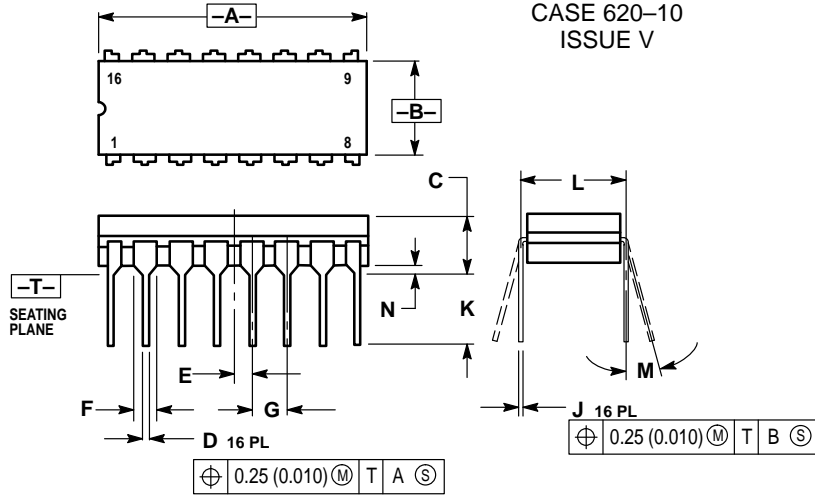
NOTES:

- 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

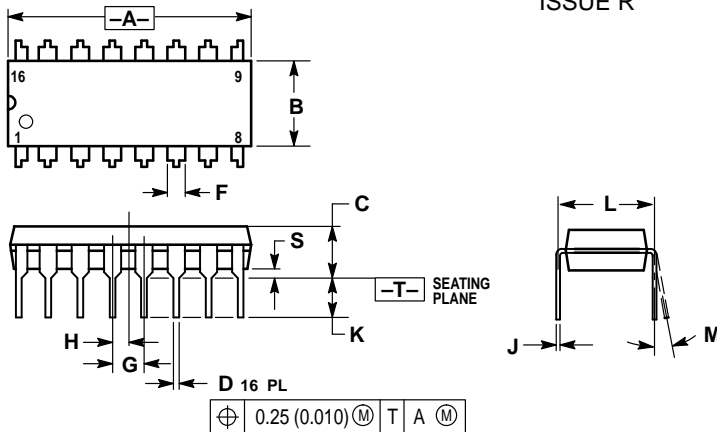
**L SUFFIX**  
**CERAMIC DIP PACKAGE**  
 CASE 620-10  
 ISSUE V



- 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°   | 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°   | 0°          | 10°   |
| S   | 0.020     | 0.040 | 0.51        | 1.01  |

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