

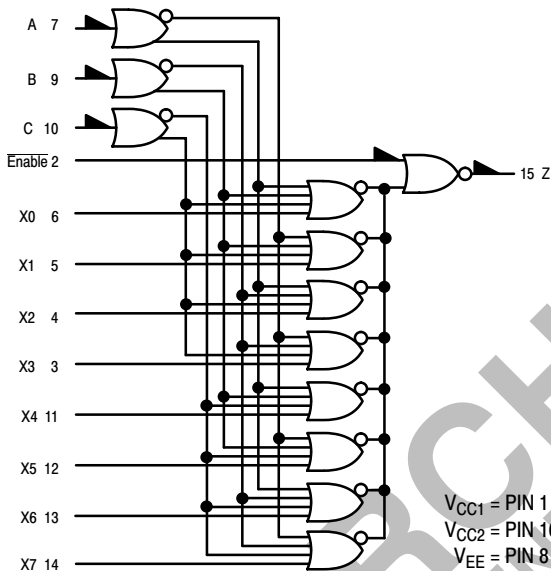
# MC10164

## 8-Line Multiplexer

The MC10164 is a high speed, low power eight-channel data selector which routes data present at one-of-eight inputs to the output. The data is routed according to the three bit code present on the address inputs. An enable input is provided for easy bit expansion.

- $P_D = 310 \text{ mW typ/pkg (No Load)}$
- $t_{pd} = 3.0 \text{ ns typ (Data to Output)}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$

### LOGIC DIAGRAM



### TRUTH TABLE

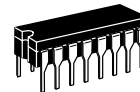
| ENABLE | ADDRESS INPUTS |   |   | Z  |
|--------|----------------|---|---|----|
|        | C              | B | A |    |
| L      | L              | L | L | X0 |
| L      | L              | L | H | X1 |
| L      | L              | H | L | X2 |
| L      | L              | H | H | X3 |
| L      | H              | L | L | X4 |
| L      | H              | L | H | X5 |
| L      | H              | H | L | X6 |
| L      | H              | H | H | X7 |
| H      | X              | X | X | L  |



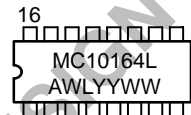
ON Semiconductor

<http://onsemi.com>

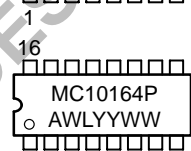
### MARKING DIAGRAMS



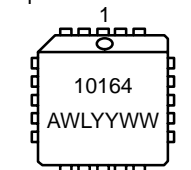
CDIP-16  
L SUFFIX  
CASE 620



PDIP-16  
P SUFFIX  
CASE 648

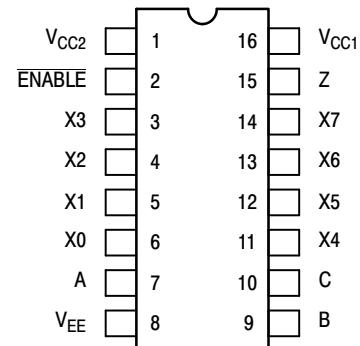


PLCC-20  
FN SUFFIX  
CASE 775



A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week

### DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package.  
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

### ORDERING INFORMATION

| Device    | Package | Shipping        |
|-----------|---------|-----------------|
| MC10164L  | CDIP-16 | 25 Units / Rail |
| MC10164P  | PDIP-16 | 25 Units / Rail |
| MC10164FN | PLCC-20 | 46 Units / Rail |

# MC10164

## 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              |             | 83     |        | 60  | 75     |        | 83     | mAdc      |
| Input Current                      | $I_{inH}$   | 2              |             | 425    |        |     | 265    |        | 265    | $\mu$ Adc |
|                                    | $I_{inL}$   | 4              | 0.5         |        | 0.5    |     |        | 0.3    |        | $\mu$ Adc |
| Output Voltage Logic 1             | $V_{OH}$    | 15             | -1.060      | -0.890 | -0.960 |     | -0.810 | -0.890 | -0.700 | Vdc       |
| Output Voltage Logic 0             | $V_{OL}$    | 15             | -1.890      | -1.675 | -1.850 |     | -1.650 | -1.825 | -1.615 | Vdc       |
| Threshold Voltage Logic 1          | $V_{OHA}$   | 15             | -1.080      |        | -0.980 |     |        | -0.910 |        | Vdc       |
| Threshold Voltage Logic 0          | $V_{OLA}$   | 15             |             | -1.655 |        |     | -1.630 |        | -1.595 | Vdc       |
| Switching Times (50 $\Omega$ Load) |             |                |             |        |        |     |        |        |        | ns        |
| Propagation Delay                  | $t_{4+15+}$ | 15             | 1.5         | 4.9    | 1.5    | 3.0 | 4.7    | 1.6    | 5.0    |           |
|                                    | $t_{4-15-}$ | 15             | 1.5         | 4.9    | 1.5    | 3.0 | 4.7    | 1.6    | 5.0    |           |
|                                    | $t_{7+15+}$ | 15             | 1.9         | 6.5    | 2.0    | 4.0 | 6.2    | 2.2    | 6.7    |           |
|                                    | $t_{7-15-}$ | 15             | 1.9         | 6.5    | 2.0    | 4.0 | 6.2    | 2.2    | 6.7    |           |
|                                    | $t_{2+15-}$ | 15             | 0.9         | 3.5    | 1.0    | 2.0 | 3.1    | 1.0    | 3.3    |           |
|                                    | $t_{2-15+}$ | 15             | 0.9         | 3.5    | 1.0    | 2.0 | 3.1    | 1.0    | 3.3    |           |
| Rise Time (20 to 80%)              | $t_+$       | 15             | 0.9         | 3.3    | 1.1    | 2.0 | 3.3    | 1.2    | 3.6    |           |
| Fall Time (20 to 80%)              | $t_-$       | 15             | 0.9         | 3.3    | 1.1    | 2.0 | 3.3    | 1.2    | 3.6    |           |

## ELECTRICAL CHARACTERISTICS (continued)

| @ Test Temperature                 |             |                | 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>EE</sub> |                           |
| -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>EE</sub> |                           |
| Power Supply Drain Current         | $I_E$       | 8              |   |                    |                     |                    | 8               | 1,16                      |
| Input Current                      | $I_{inH}$   | 2              | 4   |                    |                     |                    | 8               | 1,16                      |
|                                    | $I_{inL}$   | 4              |   | 4                  |                     |                    | 8               | 1,16                      |
| Output Voltage Logic 1             | $V_{OH}$    | 15             | 4,9                                       |                    |                     |                    | 8               | 1,16                      |
| Output Voltage Logic 0             | $V_{OL}$    | 15             | 9   |                    |                     |                    | 8               | 1,16                      |
| Threshold Voltage Logic 1          | $V_{OHA}$   | 15             | 4,9                                       |                    |                     | 2                  | 8               | 1,16                      |
| Threshold Voltage Logic 0          | $V_{OLA}$   | 15             | 9   |                    |                     | 2                  | 8               | 1,16                      |
| Switching Times (50 $\Omega$ Load) |             |                | <b>+1.11V</b>                             |                    | <b>Pulse In</b>     | <b>Pulse Out</b>   | <b>-3.2 V</b>   | <b>+2.0 V</b>             |
| Propagation Delay                  | $t_{4+15+}$ | 15             | 9   |                    | 4                   | 15                 | 8               | 1,16                      |
|                                    | $t_{4-15-}$ | 15             | 9   |                    | 4                   | 15                 | 8               | 1,16                      |
|                                    | $t_{7+15+}$ | 15             | 5   |                    | 7                   | 15                 | 8               | 1,16                      |
|                                    | $t_{7-15-}$ | 15             | 5   |                    | 7                   | 15                 | 8               | 1,16                      |
|                                    | $t_{2+15-}$ | 15             | 7,5                                       |                    | 2                   | 15                 | 8               | 1,16                      |
|                                    | $t_{2-15+}$ | 15             | 7,5                                       |                    | 2                   | 15                 | 8               | 1,16                      |
| Rise Time (20 to 80%)              | $t_+$       | 15             | 9   |                    | 4                   | 15                 | 8               | 1,16                      |
| Fall Time (20 to 80%)              | $t_-$       | 15             | 9   |                    | 4                   | 15                 | 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.

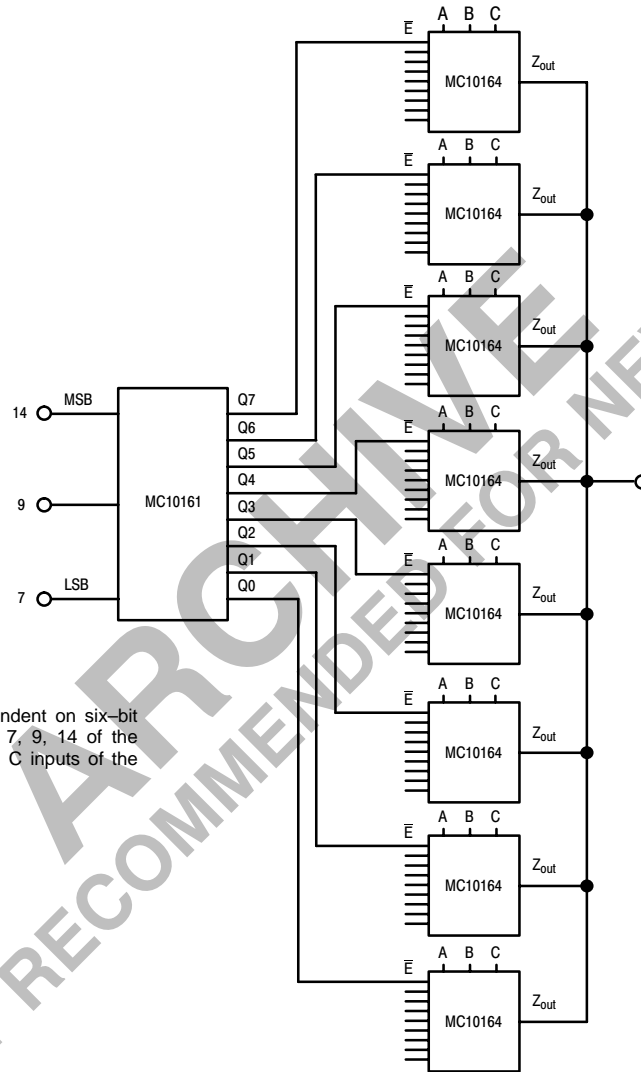
# MC10164

## APPLICATION INFORMATION

The MC10164 can be used wherever data multiplexing or parallel to serial conversion is desirable. Full parallel gating permits equal delays through any data path. The output of the MC10164 incorporates a buffer gate with eight data inputs and an enable. A high level on the enable forces the output low. The MC10164 can be connected directly to a data bus, due to its open emitter output and output enable.

Figure 1 illustrates how a 1-of-64 line multiplexer can be built with eight MC10164's wire ORED at their outputs and one MC10161 to drive the enables on each multiplexer, without speed degradation over a single MC10164 being experienced.

FIGURE 1 — 1-OF-64 LINE MULTIPLEXER

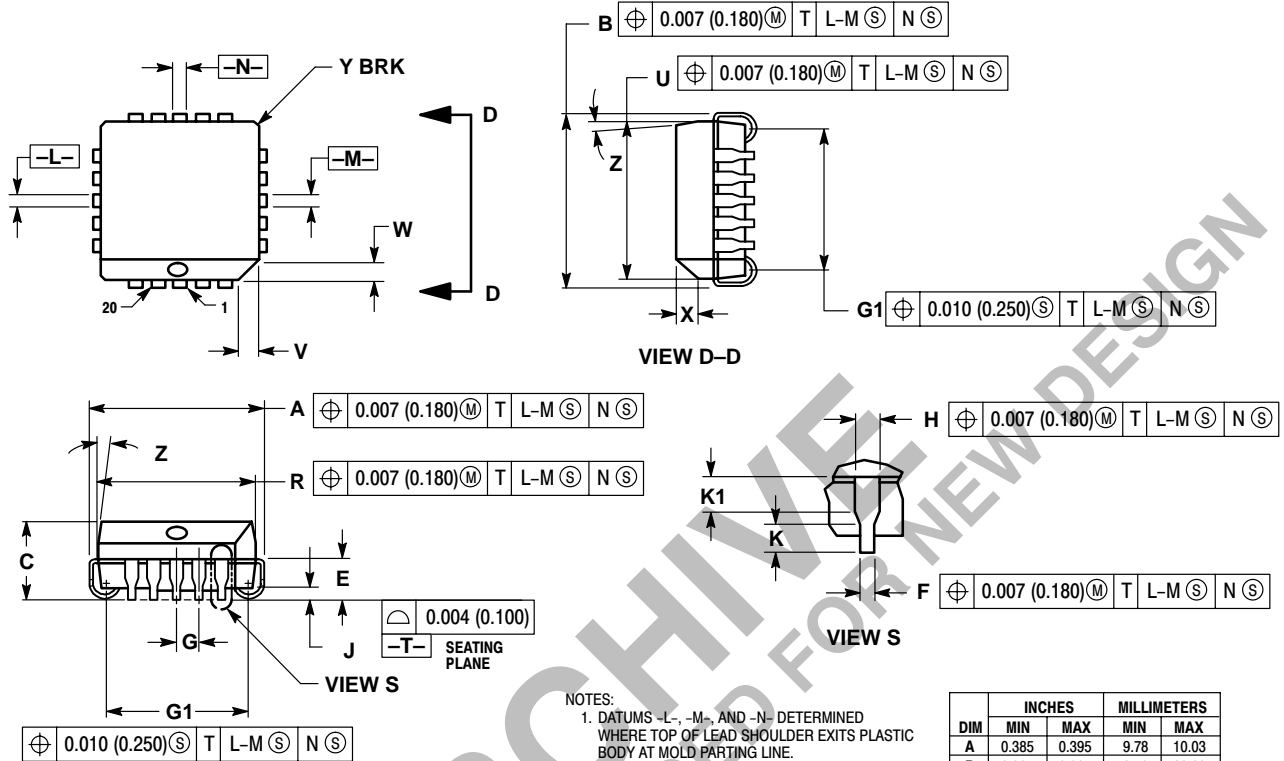


The Bit chosen is dependent on six-bit code present on inputs 7, 9, 14 of the MC10161 and the A, B, C inputs of the MC10164.

# MC10164

## PACKAGE DIMENSIONS

PLCC-20  
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        | ---   |

# MC10164

## PACKAGE DIMENSIONS

### CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- 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  |

### PDIP-16 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  |


Notes

ARCHIVE  
DEVICE NOT RECOMMENDED FOR NEW DESIGN

Notes

ARCHIVE  
DEVICE NOT RECOMMENDED FOR NEW DESIGN

ARCHIVE  
RECOMMENDED FOR NEW DESIGN

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