

# MC10114

## Triple Line Receiver

The MC10114 is a triple line receiver designed for use in sensing differential signals over long lines. An active current source and translated emitter follower inputs provide the line receiver with a common mode noise rejection limit of one volt in either the positive or the negative direction. This allows a large amount of common mode noise immunity for extra long lines.

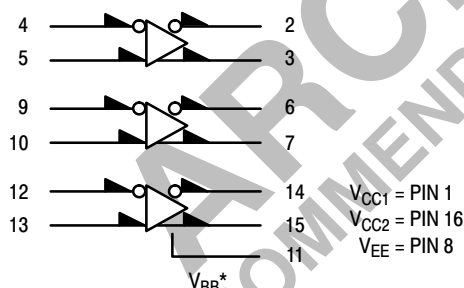
Another feature of the MC10114 is that the OR outputs go to a logic low level whenever the inputs are left floating. The outputs are each capable of driving 50 ohm transmission lines.

This device is useful in high speed central processors, minicomputers, peripheral controllers, digital communication systems, testing and instrumentation systems. The MC10114 can also be used for MOS to MECL interfacing and it is ideal as a sense amplifier for MOS RAM's.

A  $V_{BB}$  reference is provided which is useful in making the MC10114 a Schmitt trigger, allowing single-ended driving of the inputs, or other applications where a stable reference voltage is necessary. See MECL Design Handbook (HB205) pages 226 and 228.

- $P_D = 145 \text{ mW typ/pkg}$
- $t_{pd} = 2.4 \text{ ns typ (Single Ended Input)}$
- $t_{pd} = 2.0 \text{ ns typ (Differential Input)}$
- $t_r, t_f = 2.1 \text{ ns typ (20\%–80\%)}$

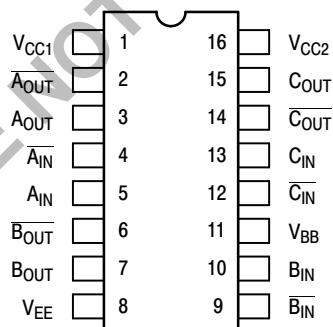
### LOGIC DIAGRAM



\* $V_{BB}$  to be used to supply bias to the MC10114 only and bypassed (when used) with 0.01  $\mu\text{F}$  to 0.1  $\mu\text{F}$  capacitor to ground (0 V).  $V_{BB}$  can source < 1.0 mA.

When the input pin with the bubble goes positive, its respective output pin with bubble goes positive.

### DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package.

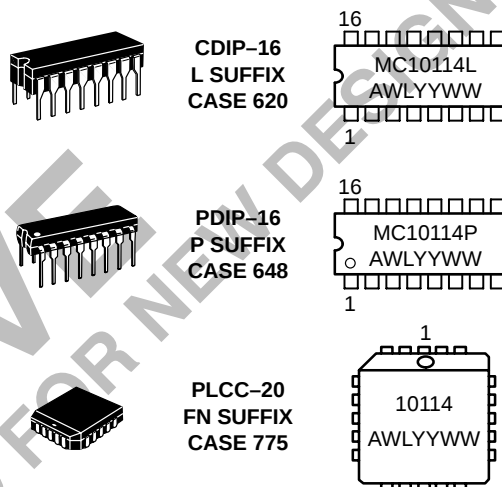
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



ON Semiconductor

<http://onsemi.com>

### MARKING DIAGRAMS



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

### ORDERING INFORMATION

| Device    | Package | Shipping        |
|-----------|---------|-----------------|
| MC10114L  | CDIP-16 | 25 Units / Rail |
| MC10114P  | PDIP-16 | 25 Units / Rail |
| MC10114FN | PLCC-20 | 46 Units / Rail |

## 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              |                  | 39               |                  | 28  | 35               |                  | 39               | mAdc |
| Input Current                    | I <sub>inH</sub>  | 4              |                  | 70               |                  |     | 45               |                  | 45               | μAdc |
|                                  | I <sub>CBO</sub>  | 4              |                  | 1.5              |                  |     | 1.0              |                  | 1.0              | μAdc |
| Output Voltage      Logic 1      | V <sub>OH</sub>   | 2<br>3         | -1.060<br>-1.060 | -0.890<br>-0.890 | -0.960<br>-0.960 |     | -0.810<br>-0.810 | -0.890<br>-0.890 | -0.700<br>-0.700 | Vdc  |
| Output Voltage      Logic 0      | V <sub>OL</sub>   | 2<br>3         | -1.890<br>-1.890 | -1.675<br>-1.675 | -1.850<br>-1.850 |     | -1.650<br>-1.650 | -1.825<br>-1.825 | -1.615<br>-1.615 | Vdc  |
| Threshold Voltage    Logic 1     | V <sub>OHA</sub>  | 2<br>3         | -1.080<br>-1.080 |                  | -0.980<br>-0.980 |     |                  | -0.910<br>-0.910 |                  | Vdc  |
| Threshold Voltage    Logic 0     | V <sub>OLA</sub>  | 2<br>3         |                  | -1.655<br>-1.655 |                  |     | -1.630<br>-1.630 |                  | -1.595<br>-1.595 | Vdc  |
| Reference Voltage                | V <sub>BB</sub>   | 11             | -1.420           | -1.280           | -1.350           |     | -1.230           | -1.295           | -1.150           | Vdc  |
| Common Mode Rejection Test       | V <sub>OH</sub>   | 2<br>3         | -1.060<br>-1.060 | -0.890<br>-0.890 | -0.960<br>-0.960 |     | -0.810<br>-0.810 | -0.890<br>-0.890 | -0.700<br>-0.700 | Vdc  |
|                                  | V <sub>OL</sub>   | 2<br>3         | -1.890<br>-1.890 | -1.675<br>-1.675 | -1.850<br>-1.850 |     | -1.650<br>-1.650 | -1.825<br>-1.825 | -1.615<br>-1.615 | Vdc  |
| Switching Times (50Ω Load)       |                   |                | Min              | Max              | Min              | Typ | Max              | Min              | Max              | ns   |
| Propagation Delay                | t <sub>4+2+</sub> | 2              | 1.0              | 4.4              | 1.0              | 2.4 | 4.0              | 0.9              | 4.3              |      |
|                                  | t <sub>4-2-</sub> | 2              | 1.0              | 4.4              | 1.0              | 2.4 | 4.0              | 0.9              | 4.3              |      |
|                                  | t <sub>4+3-</sub> | 3              | 1.0              | 4.4              | 1.0              | 2.4 | 4.0              | 0.9              | 4.3              |      |
|                                  | t <sub>4-3+</sub> | 3              | 1.0              | 4.4              | 1.0              | 2.4 | 4.0              | 0.9              | 4.3              |      |
| Rise Time            (20 to 80%) | t <sub>2+</sub>   | 2              | 1.5              | 3.8              | 1.5              | 2.1 | 3.5              | 1.5              | 3.7              |      |
|                                  | t <sub>3+</sub>   | 3              | 1.5              | 3.8              | 1.5              | 2.1 | 3.5              | 1.5              | 3.7              |      |
| Fall Time            (20 to 80%) | t <sub>2-</sub>   | 2              | 1.5              | 3.8              | 1.5              | 2.1 | 3.5              | 1.5              | 3.7              |      |
|                                  | t <sub>3-</sub>   | 3              | 1.5              | 3.8              | 1.5              | 2.1 | 3.5              | 1.5              | 3.7              |      |

## ELECTRICAL CHARACTERISTICS (continued)

| @ Test Temperature         |                   |                      | TEST VOLTAGE VALUES (Volts)               |                    |                     |                     |                        |      |           |
|----------------------------|-------------------|----------------------|-------------------------------------------|--------------------|---------------------|---------------------|------------------------|------|-----------|
|                            |                   |                      | V <sub>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmax</sub> | V <sub>BB</sub>        |      |           |
|                            |                   |                      | −0.890                                    | −1.890             | −1.205              | −1.500              | From<br>Pin<br>11      |      |           |
|                            |                   |                      | +25°C                                     | −0.810             | −1.850              | −1.105              |                        |      | −1.475    |
|                            |                   |                      | +85°C                                     | −0.700             | −1.825              | −1.035              |                        |      | −1.440    |
| Characteristic             | Symbol            | Pin<br>Under<br>Test | TEST VOLTAGE APPLIED TO PINS LISTED BELOW |                    |                     |                     |                        | Unit |           |
|                            |                   |                      | V <sub>IHmax</sub>                        | V <sub>ILmin</sub> | V <sub>IHAmin</sub> | V <sub>ILAmax</sub> | V <sub>BB</sub>        |      |           |
| Power Supply Drain Current | I <sub>E</sub>    | 8                    |                                           | 4, 9, 12           |                     |                     | 5, 10, 13              | mAdc |           |
| Input Current              | I <sub>inH</sub>  | 4                    | 4                                         | 9, 12              |                     |                     | 5, 10, 13              | μAdc |           |
|                            | I <sub>inL</sub>  | 4                    |                                           | 9, 12              |                     |                     | 5, 10, 13              | μAdc |           |
| Output Voltage             | Logic 1           | V <sub>OH</sub>      | 2<br>3                                    | 4<br>9, 12         | 9, 12<br>4          |                     | 5, 10, 13<br>5, 10, 13 | Vdc  |           |
| Output Voltage             | Logic 0           | V <sub>OL</sub>      | 2<br>3                                    | 9, 12<br>4         | 4<br>9, 12          |                     | 5, 10, 13<br>5, 10, 13 | Vdc  |           |
| Threshold Voltage          | Logic 1           | V <sub>OHA</sub>     | 2<br>3                                    | 9, 12              | 9, 12               | 4                   | 5, 10, 13<br>5, 10, 13 | Vdc  |           |
| Threshold Voltage          | Logic 0           | V <sub>OLA</sub>     | 2<br>3                                    | 9, 12              | 9, 12               | 4                   | 5, 10, 13<br>5, 10, 13 | Vdc  |           |
| Reference Voltage          |                   | V <sub>BB</sub>      | 11                                        |                    |                     |                     | 5, 10, 13              | Vdc  |           |
| Common Mode Rejection Test | V <sub>OH</sub>   | 2<br>3               |                                           |                    |                     |                     |                        | Vdc  |           |
|                            | V <sub>OL</sub>   | 2<br>3               |                                           |                    |                     |                     |                        | Vdc  |           |
| Switching Times            | (50Ω Load)        |                      |                                           |                    |                     | Pulse In            | Pulse Out              | ns   |           |
| Propagation Delay          | t <sub>4+2+</sub> | 2                    |                                           |                    |                     | 4                   | 2                      |      | 5, 10, 13 |
|                            | t <sub>4−2−</sub> | 2                    |                                           |                    |                     | 4                   | 2                      |      | 5, 10, 13 |
|                            | t <sub>4+3−</sub> | 3                    |                                           |                    |                     | 4                   | 3                      |      | 5, 10, 13 |
|                            | t <sub>4−3+</sub> | 3                    |                                           |                    |                     | 4                   | 3                      |      | 5, 10, 13 |
| Rise Time                  | (20 to 80%)       | t <sub>2+</sub>      | 2                                         |                    |                     | 4                   | 2                      |      | 5, 10, 13 |
|                            |                   | t <sub>3+</sub>      | 3                                         |                    |                     | 4                   | 3                      |      | 5, 10, 13 |
| Fall Time                  | (20 to 80%)       | t <sub>2−</sub>      | 2                                         |                    |                     | 4                   | 2                      |      | 5, 10, 13 |
|                            |                   | t <sub>3−</sub>      | 3                                         |                    |                     | 4                   | 3                      |      | 5, 10, 13 |

## ELECTRICAL CHARACTERISTICS (continued)

| @ Test Temperature         |                   |                | TEST VOLTAGE VALUES (Volts)               |                    |                    |                    |                 | (V <sub>CC</sub> )<br>Gnd |
|----------------------------|-------------------|----------------|-------------------------------------------|--------------------|--------------------|--------------------|-----------------|---------------------------|
|                            |                   |                | V <sub>IHH</sub> *                        | V <sub>ILH</sub> * | V <sub>IHL</sub> * | V <sub>ILL</sub> * | V <sub>EE</sub> |                           |
|                            |                   |                | –30°C                                     | +0.110             | –0.890             | –1.890             | –2.890          | –5.2                      |
|                            |                   |                | +25°C                                     | +0.190             | –0.850             | –1.810             | –2.850          | –5.2                      |
|                            |                   |                | +85°C                                     | +0.300             | –0.825             | –1.700             | –2.825          | –5.2                      |
| Characteristic             | Symbol            | Pin Under Test | TEST VOLTAGE APPLIED TO PINS LISTED BELOW |                    |                    |                    |                 | (V <sub>CC</sub> )<br>Gnd |
|                            |                   |                | V <sub>IHH</sub> *                        | V <sub>ILH</sub> * | V <sub>IHL</sub> * | V <sub>ILL</sub> * | V <sub>EE</sub> |                           |
| Power Supply Drain Current | I <sub>E</sub>    | 8              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Input Current              | I <sub>inH</sub>  | 4              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | I <sub>inL</sub>  | 4              |                                           |                    |                    |                    | 8, 4            | 1, 16                     |
| Output Voltage Logic 1     | V <sub>OH</sub>   | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            |                   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Output Voltage Logic 0     | V <sub>OL</sub>   | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            |                   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Threshold Voltage Logic 1  | V <sub>OHA</sub>  | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            |                   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Threshold Voltage Logic 0  | V <sub>OLA</sub>  | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            |                   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Reference Voltage          | V <sub>BB</sub>   | 11             |                                           |                    |                    |                    | 8               | 1, 16                     |
| Common Mode Rejection Test | V <sub>OH</sub>   | 2              | 4                                         | 5                  |                    |                    | 8               | 1, 16                     |
|                            |                   | 3              |                                           |                    | 5                  | 4                  | 8               | 1, 16                     |
|                            | V <sub>OL</sub>   | 2              |                                           |                    | 5                  | 4                  | 8               | 1, 16                     |
|                            |                   | 3              | 4                                         | 5                  |                    |                    | 8               | 1, 16                     |
| Switching Times (50Ω Load) |                   |                |                                           |                    |                    |                    | –3.2 V          | +2.0 V                    |
| Propagation Delay          | t <sub>4+2+</sub> | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | t <sub>4–2–</sub> | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | t <sub>4+3–</sub> | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | t <sub>4–3+</sub> | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Rise Time (20 to 80%)      | t <sub>2+</sub>   | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | t <sub>3+</sub>   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |
| Fall Time (20 to 80%)      | t <sub>2–</sub>   | 2              |                                           |                    |                    |                    | 8               | 1, 16                     |
|                            | t <sub>3–</sub>   | 3              |                                           |                    |                    |                    | 8               | 1, 16                     |

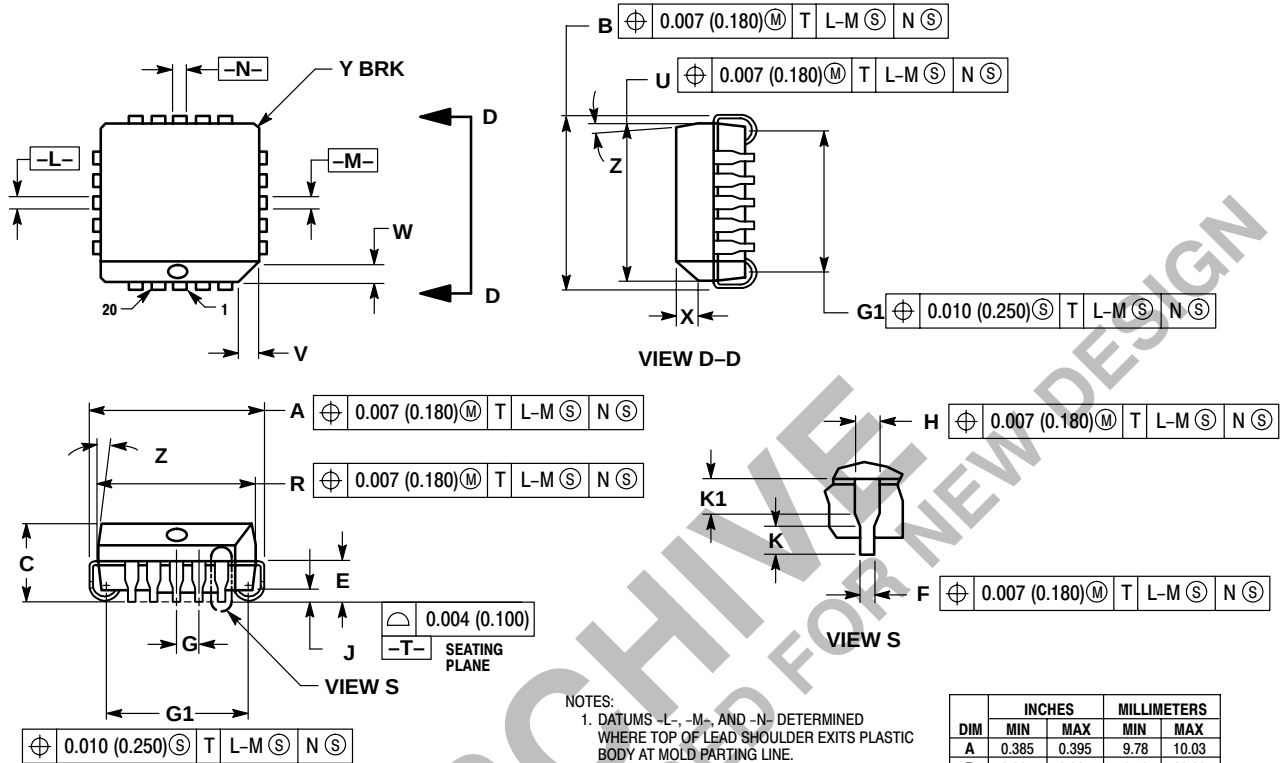
\* V<sub>IHH</sub> = Input Logic 1 level shifted positive one volt for common mode rejection testsV<sub>ILH</sub> = Input Logic 0 level shifted positive one volt for common mode rejection testsV<sub>IHL</sub> = Input Logic 1 level shifted negative one volt for common mode rejection testsV<sub>ILL</sub> = Input Logic 0 level shifted negative one volt for common mode rejection tests

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.

# MC10114

## PACKAGE DIMENSIONS

PLCC-20  
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 775-02  
ISSUE C

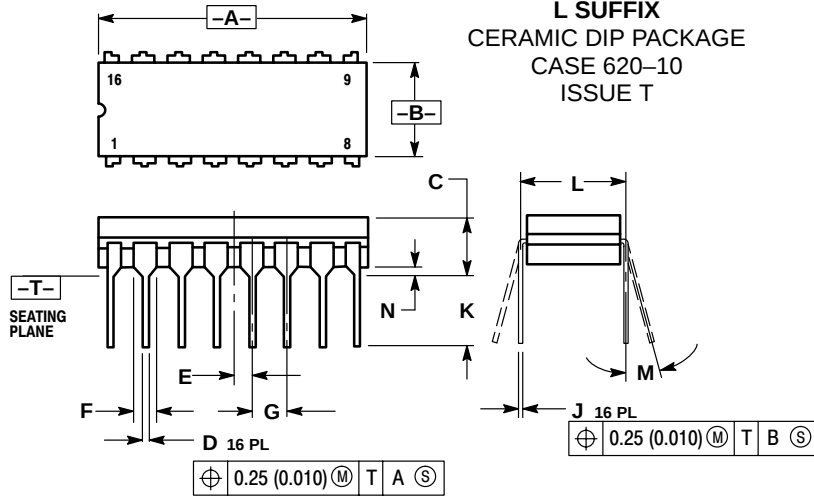


| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.385     | 0.395 | 9.78        | 10.03 |
| B   | 0.385     | 0.395 | 9.78        | 10.03 |
| C   | 0.165     | 0.180 | 4.20        | 4.57  |
| 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        | ---   |

# MC10114

## PACKAGE DIMENSIONS

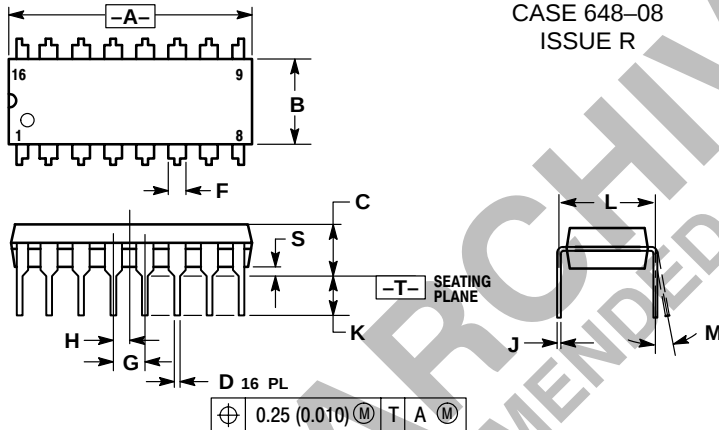
### CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- 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

ARCHIVE  
RECOMMENDED FOR NEW DESIGN

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