

Quad Line Receiver

The MC10H115 is a quad differential amplifier designed for use in sensing differential signals over long lines. This 10H part is a functional/ pinout duplication of the standard MECL 10K family part, with 100% improvement in counting frequency and no increase in power-supply current.

The base bias supply (V_{BB}) is made available at Pin 9 to make the device useful as a Schmitt trigger, or in other applications where a stable reference voltage is necessary. Active current sources provide the MC10H115 with excellent common mode rejection. If any amplifier in a package is not used, one input of that amplifier must be connected to V_{BB} (Pin 9) to prevent upsetting the current source bias network.

- Propagation Delay, 1.0 ns Typical
- Power Dissipation 110 mW Typ/Pkg (No Load)
- 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 — Surge | I_{out} | 50 100 | mA |
| Operating Temperature Range | T_A | 0 to +75 | °C |
| Storage Temperature Range — Plastic — Ceramic | T_{stg} | -55 to +150 -55 to +165 | °C |

ELECTRICAL CHARACTERISTICS ($V_{EE} = -5.2 V \pm 5\%$) (2)

| Characteristic | Symbol | 0° | | 25° | | 75° | | Unit |
|------------------------|-----------|-------|-------|---------------|-------|-------|--------|------------------|
| | | Min | Max | Min | Max | Min | Max | |
| Power Supply Current | I_E | — | 29 | — | 26 | — | 29 | mA |
| Input Current High | I_{inH} | — | 150 | — | 95 | — | 95 | μA |
| Input Leakage Current | I_{CBO} | — | 1.5 | — | 1.0 | — | 1.0 | μA |
| Reference Voltage | V_{BB} | -1.38 | -1.27 | -1.35 | -1.25 | -1.31 | -1.19 | Vdc |
| 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 (1) | V_{IH} | -1.17 | -0.84 | -1.13 | -0.81 | -1.07 | -0.735 | Vdc |
| Low Input Voltage (1) | V_{IL} | -1.95 | -1.48 | -1.95 | -1.48 | -1.95 | -1.45 | Vdc |
| Common Mode Range (3) | V_{CMR} | — | — | -2.85 to -0.8 | | — | — | Vdc |
| Input Sensitivity (4) | V_{PP} | — | — | 150 typ | | — | — | mV _{PP} |

AC PARAMETERS

| | | | | | | | | |
|-------------------|----------|-----|-----|-----|-----|------|------|----|
| Propagation Delay | t_{pd} | 0.4 | 1.3 | 0.4 | 1.3 | 0.45 | 1.45 | ns |
| Rise Time | t_r | 0.5 | 1.4 | 0.5 | 1.5 | 0.5 | 1.6 | ns |
| Fall Time | t_f | 0.5 | 1.4 | 0.5 | 1.5 | 0.5 | 1.6 | ns |

NOTES:

1. When V_{BB} is used as the reference voltage.
2. Each MECL 10H series circuit has been designed to meet the 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.
3. Differential input not to exceed 1.0 Vdc.
4. 150 mV_{p-p} differential input required to obtain full logic swing on output.

MC10H115



L SUFFIX
CERAMIC PACKAGE
CASE 620-10

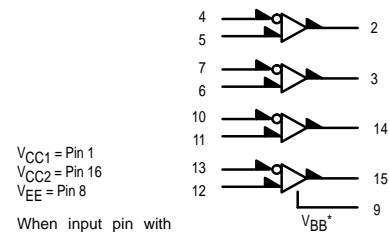


P SUFFIX
PLASTIC PACKAGE
CASE 648-08



FN SUFFIX
PLCC
CASE 775-02

LOGIC DIAGRAM



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

* V_{BB} to be used to supply bias to the MC10H115 only and bypassed (when used) with 0.01 μF to 0.1 μF capacitor to ground (0 V). V_{BB} can source < 1.0 mA.

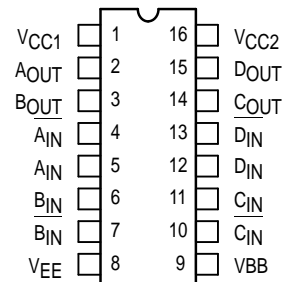
The MC10H115 is designed to be used in sensing differential signals over long lines. The bias supply (V_{BB}) is made available to make the device useful as a Schmitt trigger, or in other applications where a stable reference voltage is necessary.

Active current sources provide these receivers with excellent common-mode noise rejection. If any amplifier in a package is not used, one input of that amplifier must be connected to V_{BB} to prevent unbalancing the current-source bias network.

The MC10H115 does not have internal-input pull-down resistors. This provides high impedance to the amplifier input and facilitates differential connections.

- Applications:
- Low Level Receiver
 - Schmitt Trigger
 - Voltage Level Interface

DIP PIN ASSIGNMENT

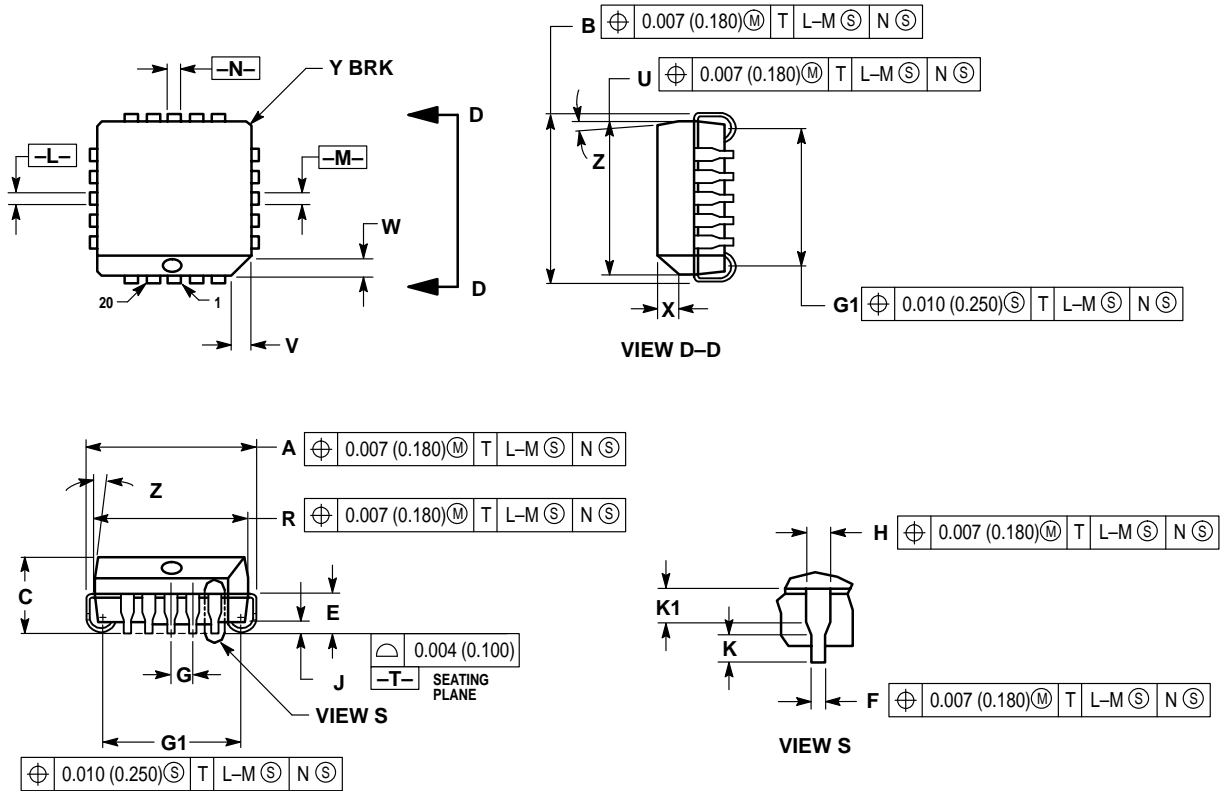


Pin assignment is for Dual-in-Line Package. For PLCC pin assignment, see the Pin Conversion Tables on page 6-11 of the Motorola MECL Data Book (DL122/D).



OUTLINE DIMENSIONS

FN SUFFIX
 PLASTIC PLCC PACKAGE
 CASE 775-02
 ISSUE C



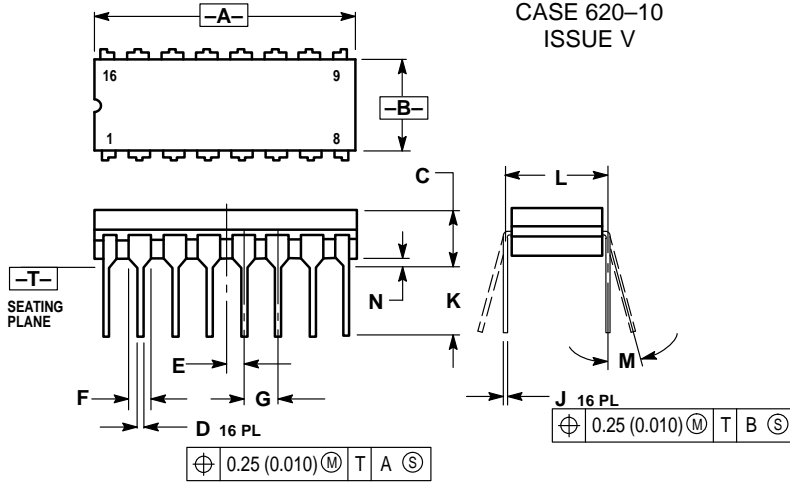
NOTES:

- 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).

| 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

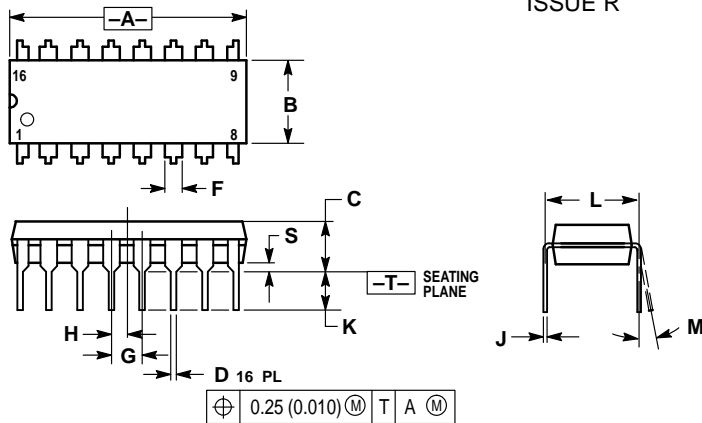
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620-10
ISSUE V



- 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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