

# Quad MECL-to-TTL Translator

The MC10H125 is a quad translator for interfacing data and control signals between the MECL section and saturated logic section of digital systems. The 10H part is a functional/pinout duplication of the standard MECL 10K family part, with 100% improvement in propagation delay, and no increase in power-supply current.

Outputs of unused translators will go to low state when their inputs are left open.

- Propagation Delay, 2.5 ns Typical
- Voltage Compensated
- Improved Noise Margin 150 mV
- MECL 10K-Compatible (Over Operating Voltage and Temperature Range)

### MAXIMUM RATINGS

| Characteristic                      | Symbol    | Rating        | Unit |
|-------------------------------------|-----------|---------------|------|
| Power Supply ( $V_{CC} = 5.0$ V)    | $V_{EE}$  | -8.0 to 0     | Vdc  |
| Power Supply ( $V_{EE} = -5.2$ V)   | $V_{CC}$  | 0 to +7.0     | Vdc  |
| Input Voltage ( $V_{CC} = 5.0$ V)   | $V_I$     | 0 to $V_{EE}$ | Vdc  |
| Operating Temperature Range         | $T_A$     | 0 to +75      | °C   |
| Storage Temperature Range — Plastic | $T_{stg}$ | -55 to +150   | °C   |
| — Ceramic                           |           | -55 to +165   | °C   |

### ELECTRICAL CHARACTERISTICS ( $V_{EE} = -5.2$ V $\pm 5\%$ ; $V_{CC} = 5.0$ V $\pm 5.0$ %)

(See Note)

| Characteristic                            | Symbol    | 0°      |       | 25°           |       | 75°   |        | Unit    |
|---|-----------|---------|-------|---------------|-------|-------|--------|---------|
|   |           | Min     | Max   | Min           | Max   | Min   | Max    |         |
| Negative Power Supply Drain Current       | $I_E$     | —       | 44    | —             | 40    | —     | 44     | mA      |
| Positive Power Supply Drain Current       | $I_{CCH}$ | —       | 63    | —             | 63    | —     | 63     | mA      |
|   | $I_{CCL}$ | —       | 40    | —             | 40    | —     | 40     | mA      |
| Input Current                             | $I_{inH}$ | —       | 225   | —             | 145   | —     | 145    | $\mu$ A |
| Input Leakage Current                     | $I_{CBO}$ | —       | 1.5   | —             | 1.0   | —     | 1.0    | $\mu$ A |
| High Output Voltage<br>$I_{OH} = -1.0$ mA | $V_{OH}$  | 2.5     | —     | 2.5           | —     | 2.5   | —      | Vdc     |
| Low Output Voltage<br>$I_{OL} = +20$ mA   | $V_{OL}$  | —       | 0.5   | —             | 0.5   | —     | 0.5    | 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     |
| Short Circuit Current                     | $I_{OS}$  | 60      | 150   | 60            | 150   | 50    | 150    | mA      |
| Reference Voltage                         | $V_{BB}$  | -1.38   | -1.27 | -1.35         | -1.25 | -1.31 | -1.19  | Vdc     |
| Common Mode Range (3)                     | $V_{CMR}$ | —       | —     | -2.85 to +0.3 |       |       |        | V       |
|   |           | Typical |       |               |       |       |        |         |
| Input Sensitivity (4)                     | $V_{PP}$  | 150     |       |               |       |       |        | mV      |

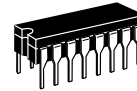
### AC PARAMETERS

| Parameter         | Symbol   | 0.8 | 3.3 | 0.85 | 3.35 | 0.9 | 3.4 | ns |
|-------------------|----------|-----|-----|------|------|-----|-----|----|
| Propagation Delay | $t_{pd}$ | 0.8 | 3.3 | 0.85 | 3.35 | 0.9 | 3.4 | ns |
| Rise Time(5)      | $t_r$    | 0.3 | 1.2 | 0.3  | 1.2  | 0.3 | 1.2 | ns |
| Fall Time(5)      | $t_f$    | 0.3 | 1.2 | 0.3  | 1.2  | 0.3 | 1.2 | ns |

### NOTES:

- When  $V_{BB}$  is used as the reference voltage.
- 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.
- Differential input not to exceed 1.0 Vdc.
- 150 mV<sub>p-p</sub> differential input required to obtain full logic swing on output.
- 1.0 V to 2.0 V w/25 pF into 500  $\Omega$ .

## MC10H125



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

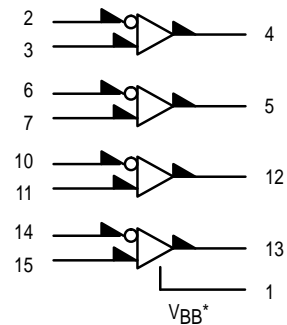


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



**FN SUFFIX**  
PLCC  
CASE 775-02

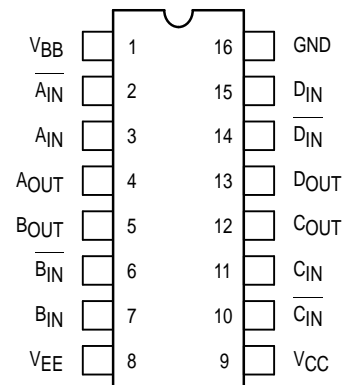
### LOGIC DIAGRAM



$V_{BB}^*$   
GND = PIN 16  
 $V_{CC}$  (+5.0 VDC) = PIN 9  
 $V_{EE}$  (-5.2 VDC) = PIN 8

\* $V_{BB}$  to be used to supply bias to the MC10H125 only and bypassed (when used) with 0.01  $\mu$ F to 0.1  $\mu$ F capacitor to ground (0 V).  $V_{BB}$  can source < 1.0 mA.

### 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).



### APPLICATION INFORMATION

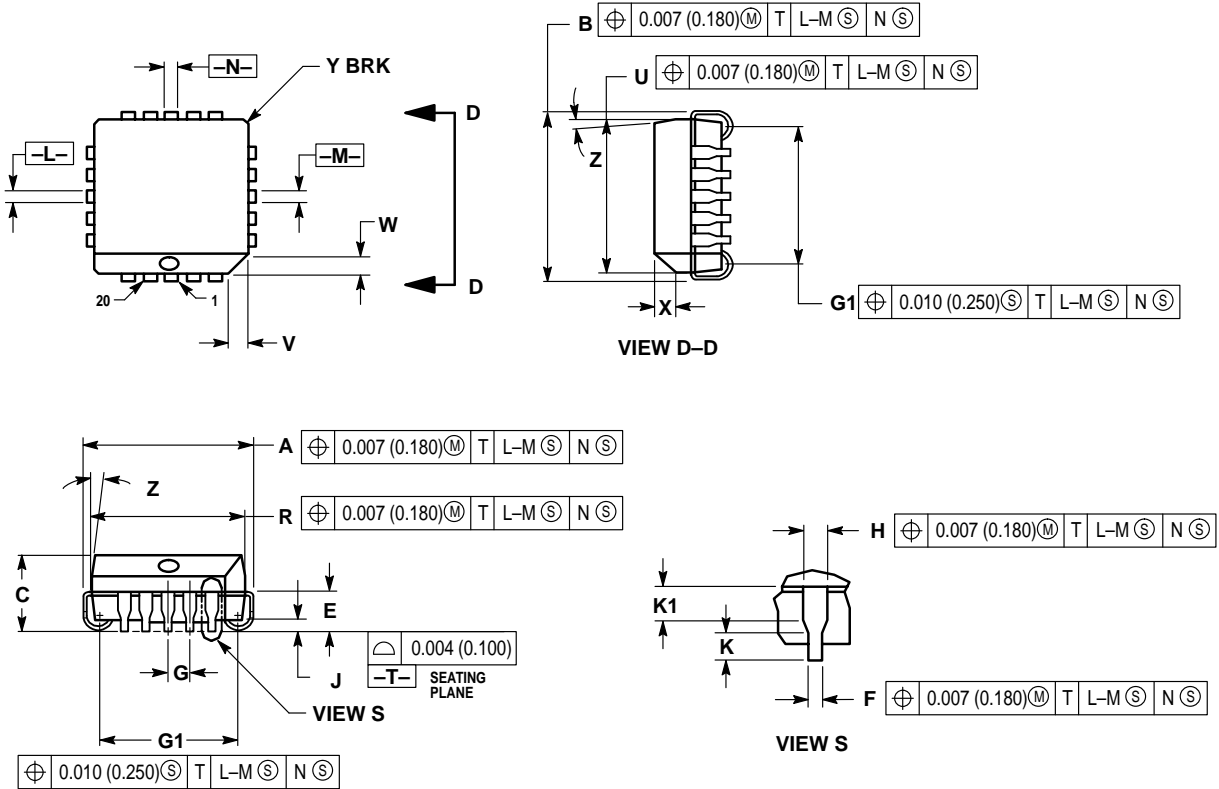
The MC10H125 incorporates differential inputs and Schottky TTL "totem pole" outputs. Differential inputs allow for use as an inverting/non-inverting translator or as a differential line receiver. The  $V_{BB}$  reference voltage is available on Pin 1 for use in single-ended input biasing. The outputs of the MC10H125 go to a low-logic level whenever the inputs are left floating, and a high-logic

output level is achieved with a minimum input level of 150 mV<sub>p-p</sub>.

An advantage of this device is that MECL-level information can be received, via balanced twisted pair lines, in the TTL equipment. This isolates the MECL-logic from the noisy TTL environment. Power supply requirements are ground, +5.0 volts and -5.2 volts.

OUTLINE DIMENSIONS

FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C

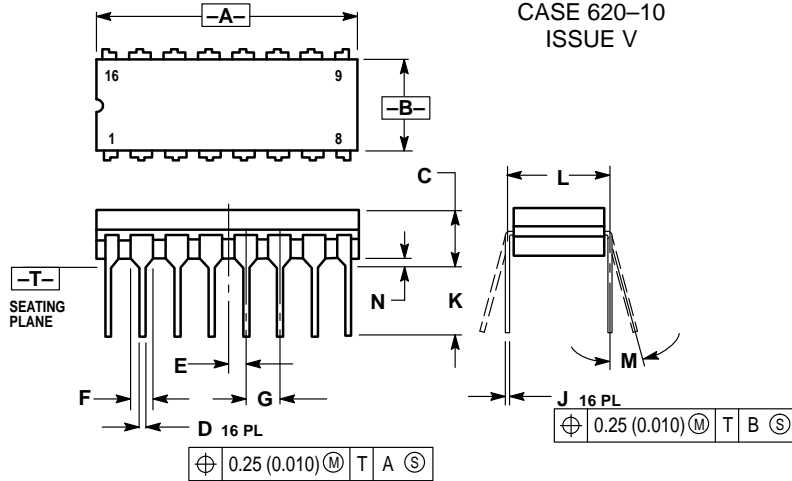


- NOTES:
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
  - DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
  - DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
  - DIMENSIONING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

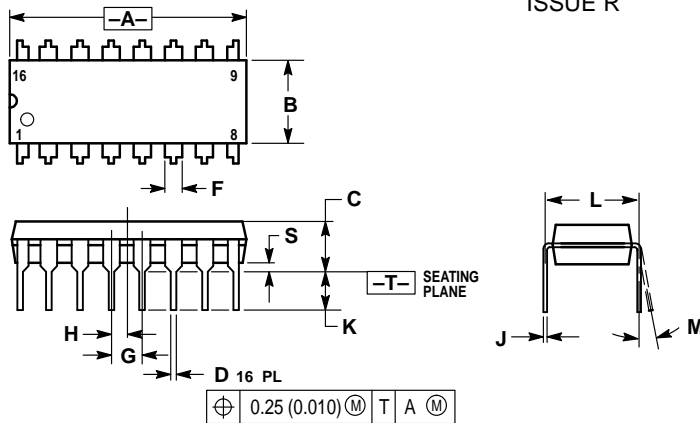
L SUFFIX  
CERAMIC DIP PACKAGE  
CASE 620-10  
ISSUE V



- 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 |       |             |       |
| F   | 0.055     | 0.065 | 1.40        | 1.65  |
| G   | 0.100 BSC |       |             |       |
| H   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.125     | 0.170 | 3.18        | 4.31  |
| L   | 0.300 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 |       |             |       |
| H   | 0.050 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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