

# MC10H350

## PECL\* to TTL Translator

(+5 Vdc Power Supply Only)

### Description

The MC10H350 is a member of the 10H family of high performance ECL logic. It consists of 4 translators with differential inputs and TTL outputs. The 3-state outputs can be disabled by applying a HIGH TTL logic level on the common OE input.

The MC10H350 is designed to be used primarily in systems incorporating both ECL and TTL logic operating off a common power supply. The separate  $V_{CC}$  power pins are not connected internally and thus isolate the noisy TTL  $V_{CC}$  runs from the relatively quiet ECL  $V_{CC}$  runs on the printed circuit board. The differential inputs allow the MC10H350 to be used as an inverting or noninverting translator, or a differential line receiver. The MC10H350 can also drive CMOS with the addition of a pullup resistor.

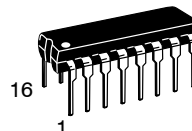
### Features

- Propagation Delay, 3.5 ns Typical
- MECL 10K™ Compatible
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant

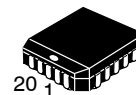


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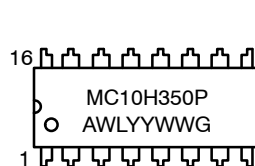


PDIP-16  
P SUFFIX  
CASE 648-08

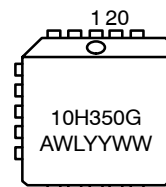


PLL-20  
FN SUFFIX  
CASE 775-02

### MARKING DIAGRAMS\*



PDIP-16



PLL-20

A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G = Pb-Free Package

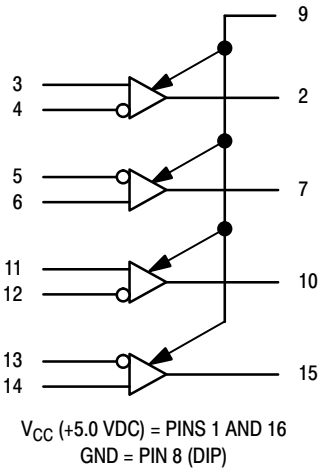
\*For additional marking information, refer to Application Note [AND8002/D](#).

### ORDERING INFORMATION

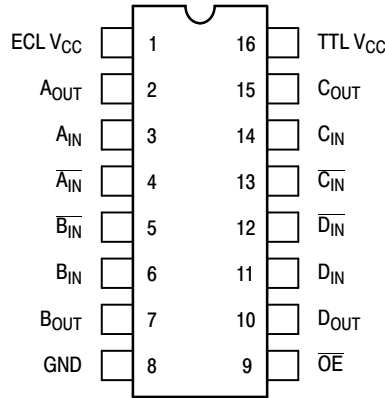
| Device        | Package              | Shipping†       |
|---------------|----------------------|-----------------|
| MC10H350FNG   | PLL-20<br>(Pb-Free)  | 46 Units / Tube |
| MC10H350FNR2G | PLL-20<br>(Pb-Free)  | 500 Tape & Reel |
| MC10H350PG    | PDIP-16<br>(Pb-Free) | 25 Units / Tube |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

# MC10H350

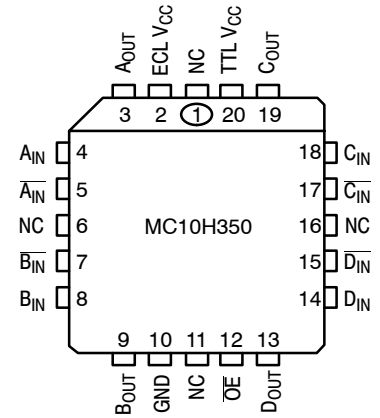


**Figure 1. Logic Diagram**



Pin assignment is for Dual-in-Line Package.

**Figure 2. Dip Pin Assignment**



**Figure 3. PLCC-20 Pin Assignment**

**Table 1. MAXIMUM RATINGS**

| Symbol    | Characteristic                         | Rating      | Unit |
|-----------|--|-------------|------|
| $V_{CC}$  | Power Supply ( $V_{EE} = GND$ )        | 7.0         | Vdc  |
| $T_A$     | Operating Temperature Range            | 0 to +75    | °C   |
| $T_{stg}$ | Storage Temperature Range<br>- Plastic | -55 to +150 | °C   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

# MC10H350

**Table 2. ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 5.0\text{ V} \pm 5\%$ ) (Note 1)

| Symbol                | Characteristic   | $T_A = 0^\circ\text{C to } 75^\circ\text{C}$ |            | Unit          |
|-----------------------|--|--|------------|---------------|
|                       |  | Min  | Max        |               |
| $I_{CC}$              | Power Supply Current<br>TTL<br>ECL                         | –<br>–                                       | 20<br>12   | mA            |
| $I_{IH}$<br>$I_{INH}$ | Input Current High<br>Pin 9<br>Others                      | –<br>–                                       | 20<br>50   | $\mu\text{A}$ |
| $I_{IL}$<br>$I_{INL}$ | Input Current Low<br>Pin 9<br>Others                       | –<br>–                                       | –0.6<br>50 | mA            |
| $V_{IH}$              | Input Voltage High<br>Pin 9                                | 2.0  | –          | Vdc           |
| $V_{IL}$              | Input Voltage Low<br>Pin 9                                 | –  | 0.8        | Vdc           |
| $V_{DIFF}$            | Differential Input Voltage (Note 1)<br>Pins 3–6, 11–14 (1) | 350  | –          | mV            |
| $V_{CM}$              | Voltage Common Mode<br>Pins 3–6, 11–14                     | 2.8  | $V_{CC}$   | Vdc           |
| $V_{OH}$              | Output Voltage High<br>$I_{OH} = 3.0\text{ mA}$            | 2.7  | –          | Vdc           |
| $V_{OL}$              | Output Voltage Low<br>$I_{OL} = 20\text{ mA}$              | –  | 0.5        | Vdc           |
| $I_{OS}$              | Short Circuit Current<br>$V_{OUT} = 0\text{ V}$            | –60  | –150       | mA            |
| $I_{OZH}$             | Output Disable Current High<br>$V_{OUT} = 2.7\text{ V}$    | –  | 50         | $\mu\text{A}$ |
| $I_{OZL}$             | Output Disable Current Low<br>$V_{OUT} = 0.5\text{ V}$     | –  | –50        | $\mu\text{A}$ |

\*Positive Emitter Coupled Logic

1. Common mode input voltage to pins 3–4, 5–6, 11–12, 13–14 must be between the values of 2.8 V and 5.0 V. This common mode input voltage range includes the differential input swing.
2. For single-ended use, apply 3.75 V ( $V_{BB}$ ) to either input depending on output polarity required. Signal level range to other input is 3.3 V to 4.2 V.
3. Any unused gates should have the inverting inputs tied to  $V_{CC}$  and the noninverting inputs tied to ground to prevent output glitching.

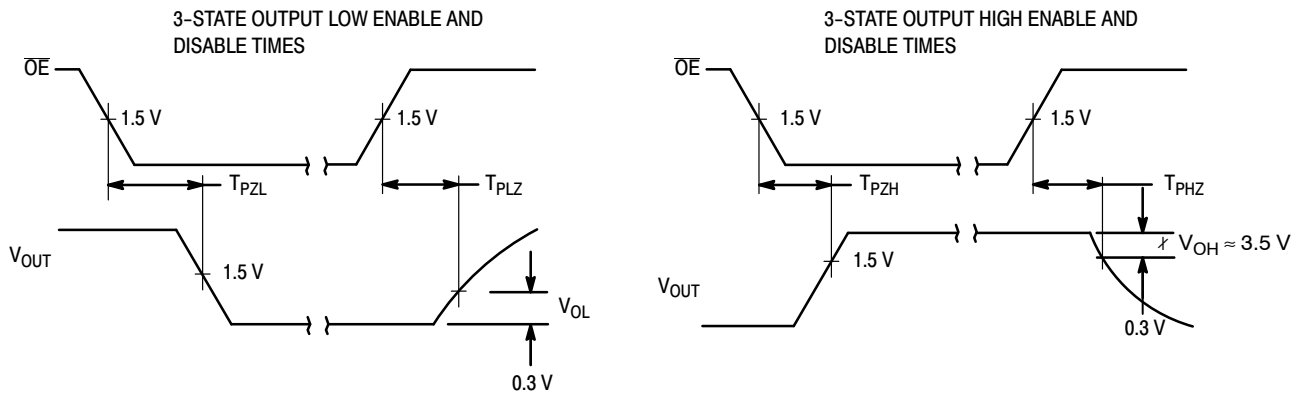
**Table 3. AC PARAMETERS** ( $C_L = 50\text{ pF}$ ) ( $V_{CC} = 5.0 \pm 5\%$ ) ( $T_A = 0^\circ\text{C to } 75^\circ\text{C}$ )

| Symbol                   | Characteristic                        | $T_A = 0^\circ\text{C to } 75^\circ\text{C}$ |            | Unit |
|--------------------------|---------------------------------------|--|------------|------|
|                          |                                       | Min  | Max        |      |
| $t_{pd}$                 | Propagation Delay Data (50% to 1.5 V) | 1.5  | 5.0        | ns   |
| $t_r$                    | Rise Time (Note 1)                    | 0.3  | 1.6        | ns   |
| $t_f$                    | Fall Time (Note 1)                    | 0.3  | 1.6        | ns   |
| $t_{pdLZ}$<br>$t_{pdHZ}$ | Output Disable Time                   | 2.0<br>2.0                                   | 6.0<br>6.0 | ns   |
| $t_{pdZL}$<br>$t_{pdZH}$ | Output Enable Time                    | 2.0<br>2.0                                   | 8.0<br>8.0 | ns   |

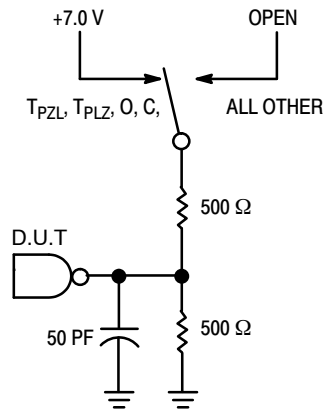
NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

1. 1.0 V to 2.0 V w/50 pF into 500  $\Omega$ .

# MC10H350



**Figure 4. 3-State Switching Waveforms**



\*INCLUDES JIG AND PROBE CAPACITANCE

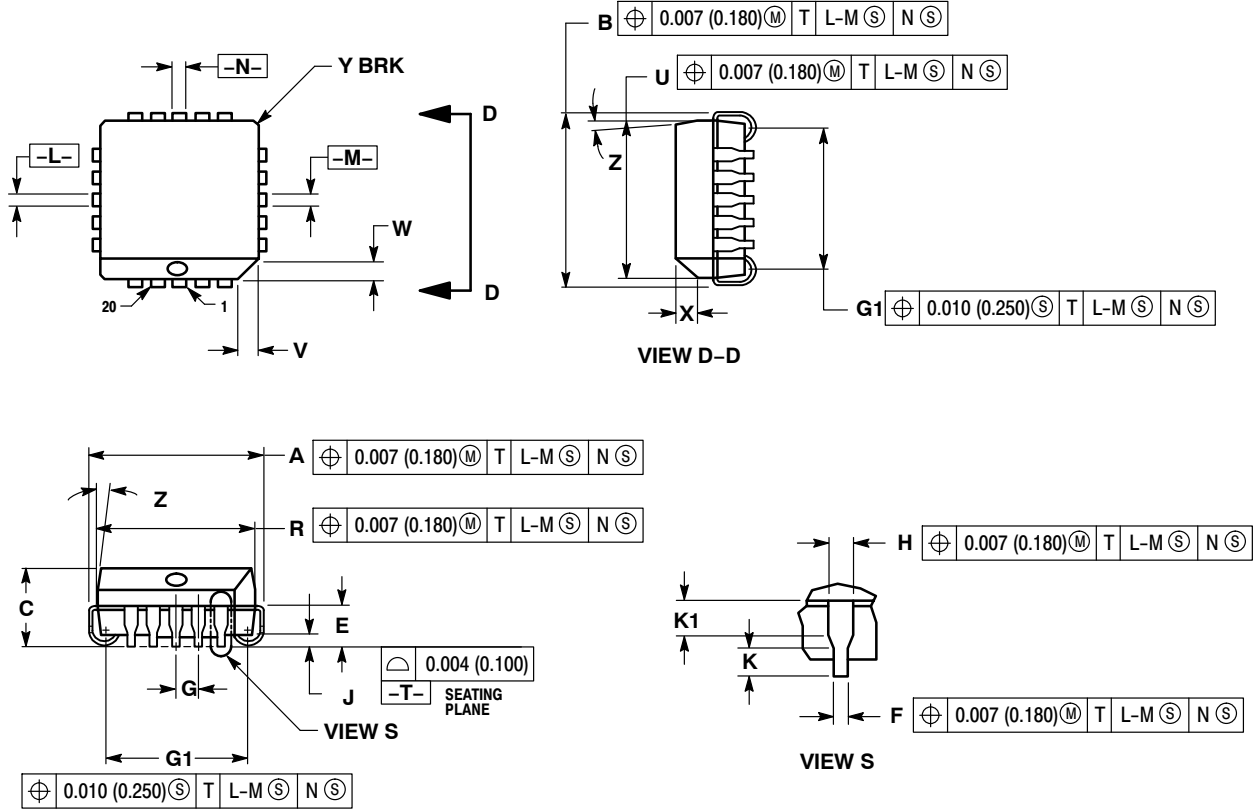
Application Note: Pin 9 is an  $\overline{OE}$  and the MC10H350 is disabled when  $\overline{OE}$  is at  $V_{IH}$  or higher.

**Figure 5. Test Load**

# MC10H350

## PACKAGE DIMENSIONS

20 LEAD PLLC  
FN SUFFIX  
CASE 775-02  
ISSUE F



**NOTES:**

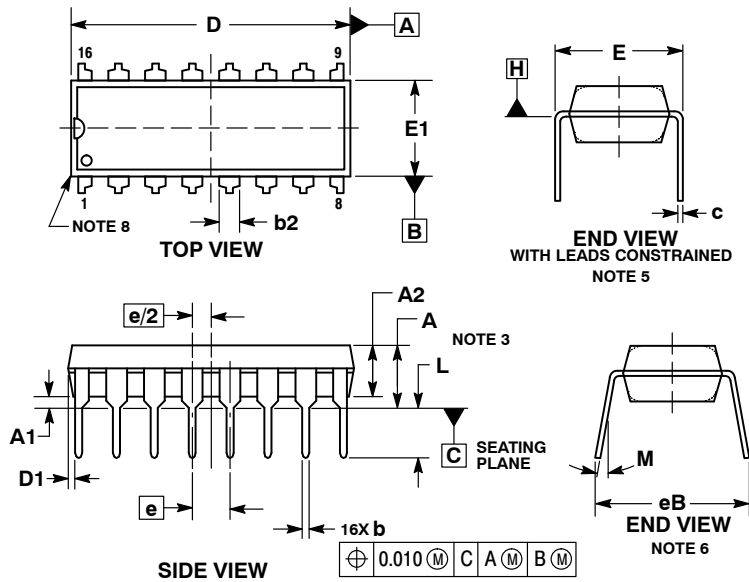
1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
2. DIMENSIONS IN INCHES.
3. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
4. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
5. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
6. DIMENSIONS IN 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.
7. 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     | 0.021 | 0.33        | 0.53  |
| 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        | ----  |

# MC10H350

## PACKAGE DIMENSIONS

PDIP-16  
P SUFFIX  
CASE 648-08  
ISSUE V



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSIONS A, A1 AND L ARE MEASURED WITH THE PACKAGE SEATED IN JEDEC SEATING PLANE GAUGE GS-3.
4. DIMENSIONS D, D1 AND E1 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS ARE NOT TO EXCEED 0.10 INCH.
5. DIMENSION E IS MEASURED AT A POINT 0.015 BELOW DATUM PLANE H WITH THE LEADS CONSTRAINED PERPENDICULAR TO DATUM C.
6. DIMENSION eB IS MEASURED AT THE LEAD TIPS WITH THE LEADS UNCONSTRAINED.
7. DATUM PLANE H IS COINCIDENT WITH THE BOTTOM OF THE LEADS, WHERE THE LEADS EXIT THE BODY.
8. PACKAGE CONTOUR IS OPTIONAL (ROUNDED OR SQUARE CORNERS).

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | ----      | 0.210 | ----        | 5.33  |
| A1  | 0.015     | ----  | 0.38        | ----  |
| A2  | 0.115     | 0.195 | 2.92        | 4.95  |
| b   | 0.014     | 0.022 | 0.35        | 0.56  |
| b2  | 0.060 TYP |       | 1.52 TYP    |       |
| C   | 0.008     | 0.014 | 0.20        | 0.36  |
| D   | 0.735     | 0.775 | 18.67       | 19.69 |
| D1  | 0.005     | ----  | 0.13        | ----  |
| E   | 0.300     | 0.325 | 7.62        | 8.26  |
| E1  | 0.240     | 0.280 | 6.10        | 7.11  |
| e   | 0.100 BSC |       | 2.54 BSC    |       |
| eB  | ----      | 0.430 | ----        | 10.92 |
| L   | 0.115     | 0.150 | 2.92        | 3.81  |
| M   | ----      | 10°   | ----        | 10°   |

### STYLE 1:

- PIN 1. CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE

### STYLE 2:

- PIN 1. COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- GATE
- SOURCE
- GATE
- SOURCE
- GATE
- SOURCE
- GATE
- SOURCE

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