

# PECL\* to TTL Translator (+5 Vdc Power Supply Only)

The MC10H350 is a member of Motorola's 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 H350 to be used as an inverting translator, or a differential line receiver. The H350 can also drive CMOS with the addition of a pullup resistor.

- Propagation Delay, 3.5 ns Typical
- MECL 10K-Compatible

## MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Power Supply ( $V_{EE} = \text{Gnd}$ )	$V_{CC}$	7.0	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 ( $V_{CC} = 5.0 \text{ V} \pm 5\%$ ) (See Note 1)

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

- (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 ( $V_{DD}$ ) 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 non-inverting inputs tied to ground to prevent output glitching.
- (4) 1.0 V to 2.0 V w/50 pF into 500 ohms.

\*Positive Emitter Coupled Logic

## MC10H350



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

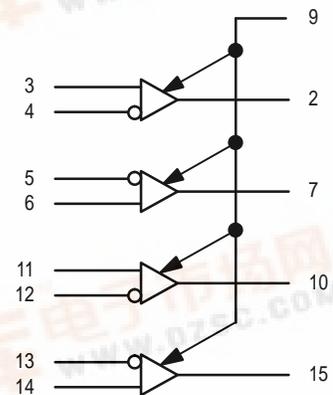


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



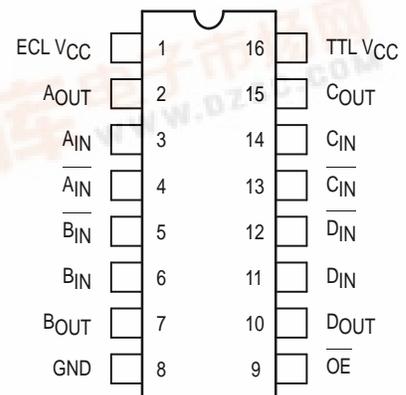
**FN SUFFIX**  
PLCC  
CASE 775-02

## LOGIC DIAGRAM



$V_{CC} (+5.0 \text{ VDC}) = \text{PINS 1 AND 16}$   
 $\text{GND} = \text{PIN 8}$

## 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).

# MC10H350

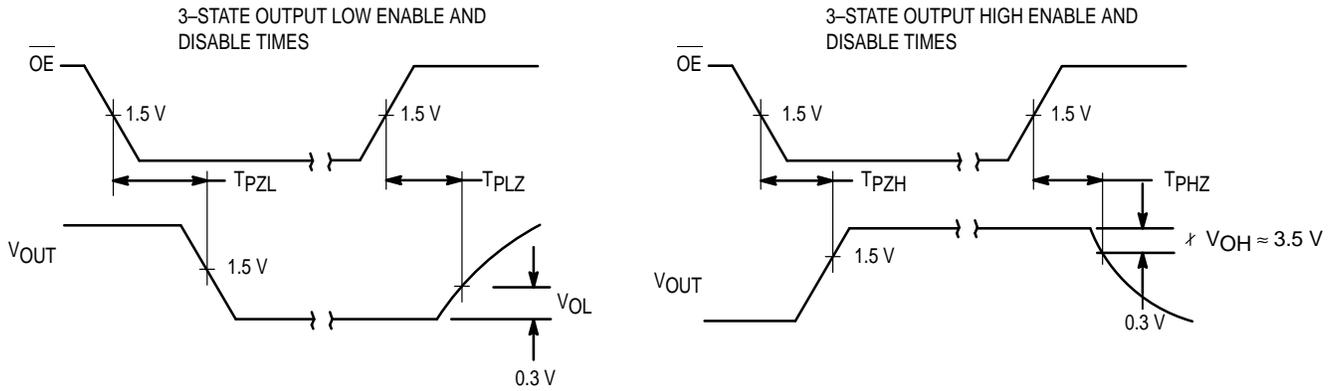
## ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5.0 \text{ V} \pm 5\%$ ) (See Notes 1 & 4)

Characteristic	Symbol	$T_A = 0^\circ\text{C to } 75^\circ\text{C}$		Unit
		Min	Max	

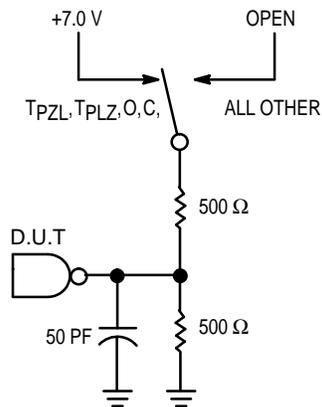
## AC PARAMETERS ( $C_L = 50 \text{ pF}$ ) ( $V_{CC} = 5.0 \pm 5\%$ ) ( $T_A = 0^\circ\text{C to } 75^\circ\text{C}$ )

Propagation Delay Data	$t_{pd}$	1.5	5.0	ns
Rise Time	$t_r$	0.3	1.6	ns
Fall Time	$t_f$	0.3	1.6	ns
Output Disable Time	$t_{pdLZ}$	2.0	6.0	ns
	$t_{pdHZ}$	2.0	6.0	
Output Enable Time	$t_{pdZL}$	2.0	8.0	ns
	$t_{pdZH}$	2.0	8.0	

### 3-STATE SWITCHING WAVEFORMS



### TEST LOAD

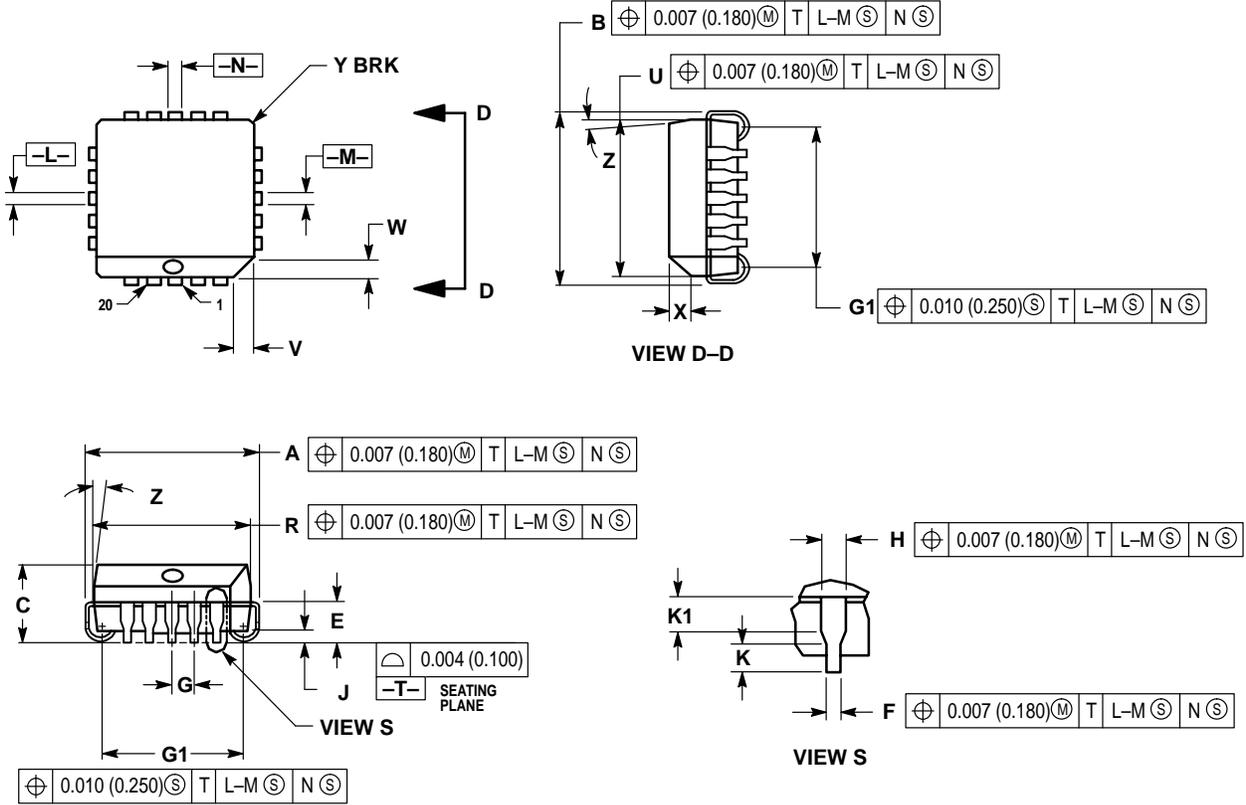


\*INCLUDES JIG AND PROBE CAPACITANCE

Application Note: Pin 9 is an  $\overline{\text{OE}}$  and the 10H350 is disabled when  $\overline{\text{OE}}$  is at  $V_{IH}$  or higher.

OUTLINE DIMENSIONS

FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C

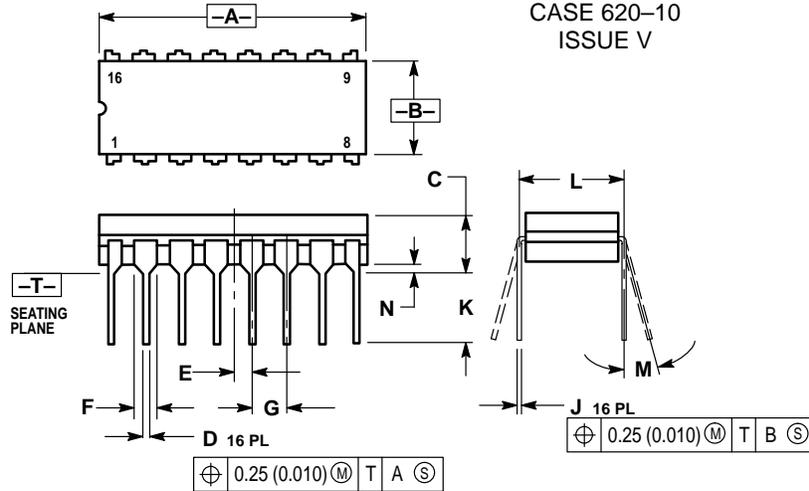


- NOTES:
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
  - DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
  - DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
  - DIMENSIONING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

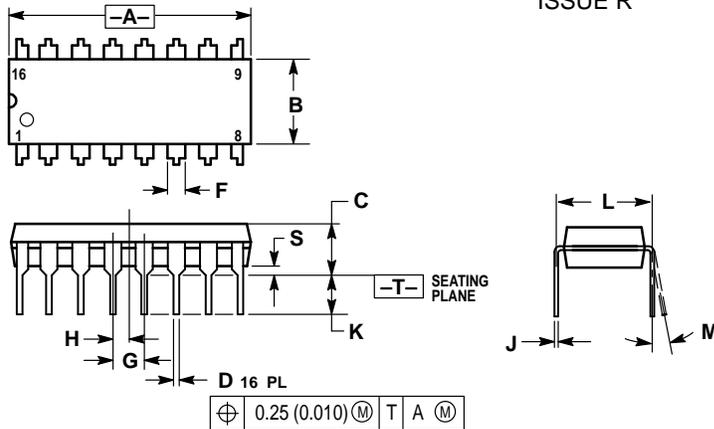
**L SUFFIX**  
CERAMIC DIP PACKAGE  
CASE 620-10  
ISSUE V



- 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°	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°	0°	10°
S	0.020	0.040	0.51	1.01

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