

# 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

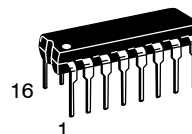
- Propagation Delay, 3.5 ns Typical
- MECL 10K™ Compatible
- Pb-Free Packages are Available\*



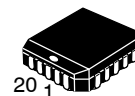
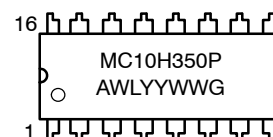
**ON Semiconductor®**

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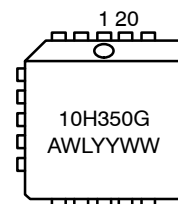
### MARKING DIAGRAMS\*



**PDIP-16  
P SUFFIX  
CASE 648**



**PLCC-20  
FN SUFFIX  
CASE 775**



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

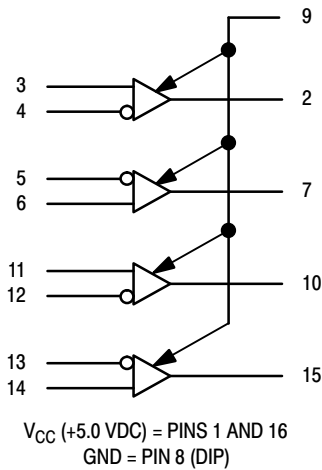
\*For additional marking information, refer to Application Note AND8002/D.

### ORDERING INFORMATION

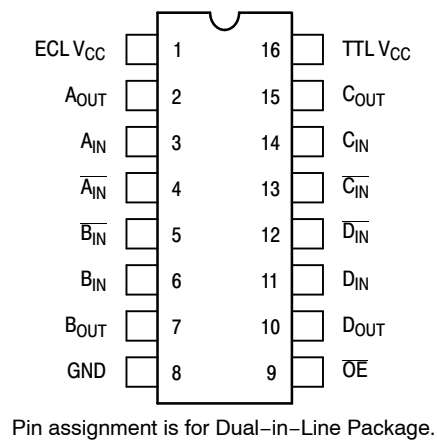
See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

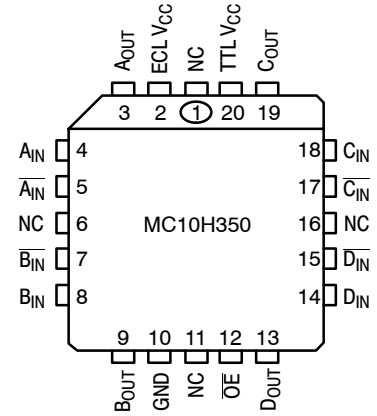
# MC10H350



**Figure 1. Logic Diagram**



**Figure 2. Dip Pin Assignment**



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

**Table 1. MAXIMUM RATINGS**

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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# MC10H350

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

Symbol	Characteristic	T <sub>A</sub> = 0°C to 75°C		Unit	
		Min	Max		
I <sub>CC</sub>	Power Supply Current				
	TTL	–	20	mA	
	ECL	–	12		
I <sub>IH</sub> I <sub>INH</sub>	Input Current High			μA	
	Pin 9	–	20		
	Others	–	50		
I <sub>IL</sub> I <sub>INL</sub>	Input Current Low			mA	
	Pin 9	–	–0.6		
	Others	–	50	μA	
V <sub>IH</sub>	Input Voltage High	Pin 9	2.0	–	Vdc
V <sub>IL</sub>	Input Voltage Low	Pin 9	–	0.8	Vdc
V <sub>DIFF</sub>	Differential Input Voltage (Note 1) Pins 3–6, 11–14 (1)		350	–	mV
V <sub>CM</sub>	Voltage Common Mode Pins 3–6, 11–14		2.8	V <sub>CC</sub>	Vdc
V <sub>OH</sub>	Output Voltage High I <sub>OH</sub> = 3.0 mA		2.7	–	Vdc
V <sub>OL</sub>	Output Voltage Low I <sub>OL</sub> = 20 mA		–	0.5	Vdc
I <sub>OS</sub>	Short Circuit Current V <sub>OUT</sub> = 0 V		–60	–150	mA
I <sub>OZH</sub>	Output Disable Current High V <sub>OUT</sub> = 2.7 V		–	50	μA
I <sub>OZL</sub>	Output Disable Current Low V <sub>OUT</sub> = 0.5 V		–	–50	μA

\*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.

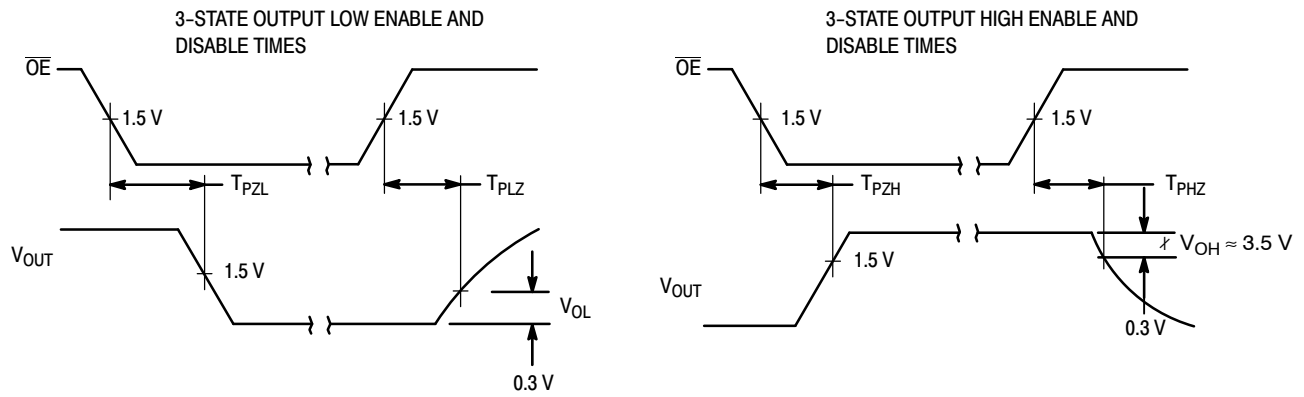
**Table 3. AC PARAMETERS** ( $C_L = 50 \text{ pF}$ ) ( $V_{CC} = 5.0 \pm 5\%$ ) ( $T_A = 0^\circ\text{C to } 75^\circ\text{C}$ )

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 4)	0.3	1.6	ns
$t_f$	Fall Time (Note 4)	0.3	1.6	ns
$t_{pdLZ}$ $t_{pdHZ}$	Output Disable Time	2.0	6.0	ns
		2.0	6.0	
$t_{pdZL}$ $t_{pdZH}$	Output Enable Time	2.0	8.0	ns
		2.0	8.0	

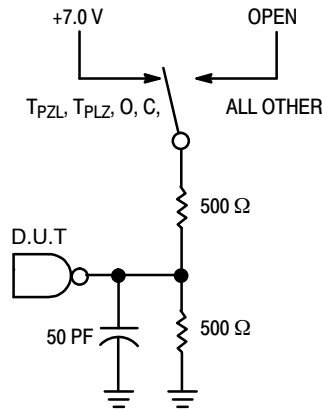
NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional 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.

4. 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<sub>IH</sub> or higher.

**Figure 5. Test Load**

## ORDERING INFORMATION

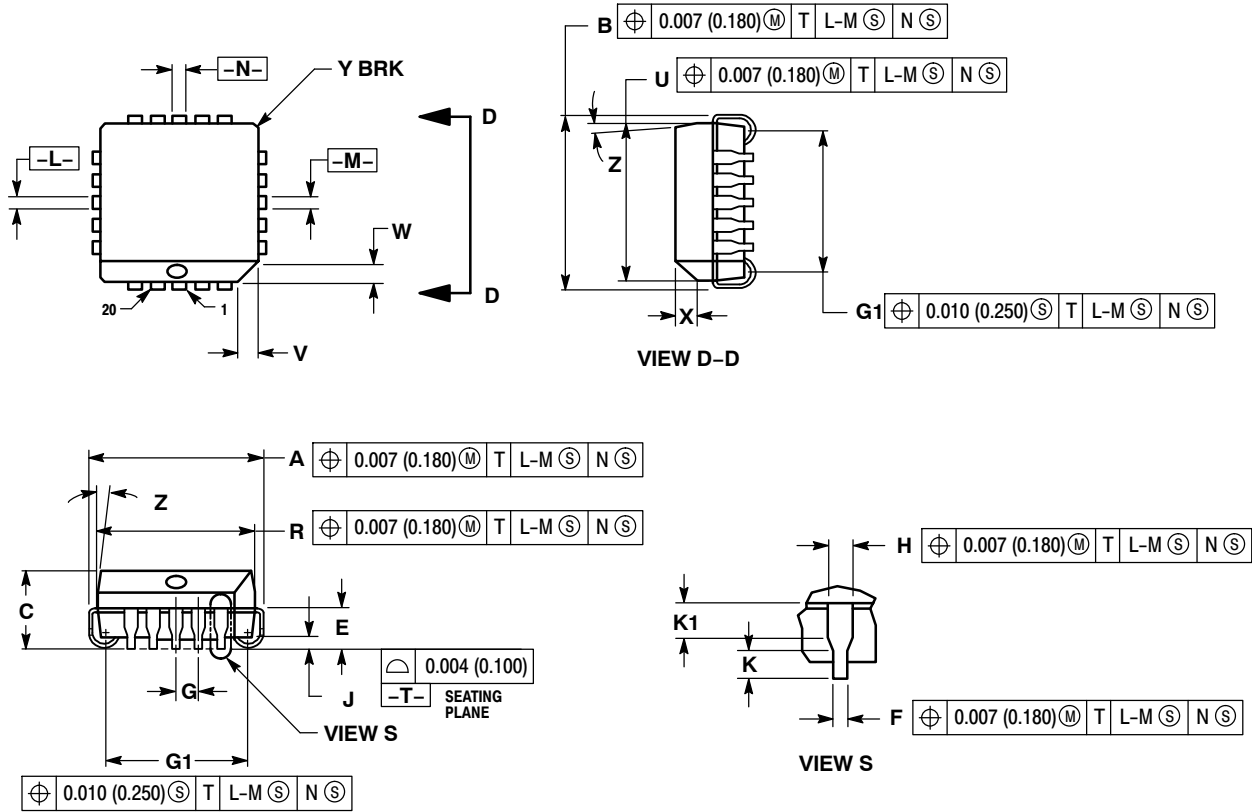
Device	Package	Shipping <sup>†</sup>
MC10H350FNG	PLCC-20 (Pb-Free)	46 Units / Rail
MC10H350FNR2G	PLCC-20 (Pb-Free)	500 / Tape & Reel
MC10H350P	PDIP-16	25 Unit / Rail
MC10H350PG	PDIP-16 (Pb-Free)	25 Unit / Rail

<sup>†</sup>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

## PACKAGE DIMENSIONS

20 LEAD PLCC  
CASE 775-02  
ISSUE F



### NOTES:

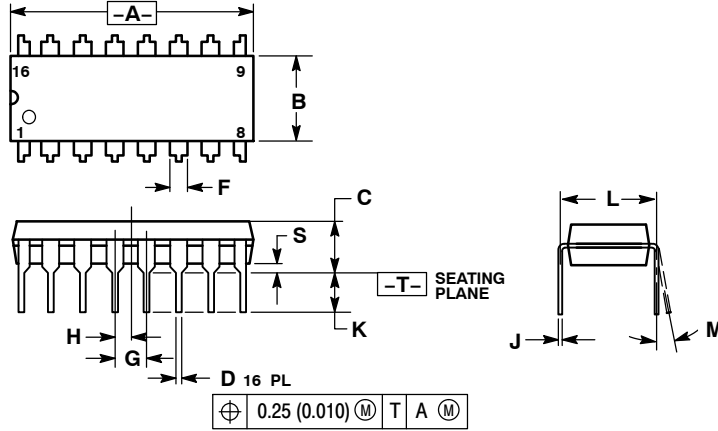
1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
2. DIMENSIONS IN INCHES.
3. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
4. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
5. DIMENSIONS R AND U DO NOT INCLUDE MOLD 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 T



### 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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