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## MC10H601, MC100H601

## 9-Bit ECL to TTL Translator

## Description

The $\mathrm{MC} 10 \mathrm{H} / 100 \mathrm{H} 601$ is a 9 -bit, dual supply ECL to TTL translator. Devices in the ON Semiconductor 9-bit translator series utilize the 28 -lead PLCC for optimal power pinning, signal flow-through and electrical performance.

The devices feature a 48 mA TTL output stage, and AC performance is specified into both a 50 pF and 200 pF load capacitance. For the 3 -state output disable, both ECL and TTL control inputs are provided, allowing maximum design flexibility.

The 10 H version is compatible with MECL $10 \mathrm{H}^{\mathrm{TM}}$ ECL logic levels. The 100 H version is compatible with 100 K levels.

## Features

- 9-Bit Ideal for Byte-Parity Applications
- 3-State TTL Outputs
- Flow-Through Configuration
- Extra TTL and ECL Power Pins to Minimize Switching Noise
- ECL and TTL 3-State Control Inputs
- Dual Supply
- 4.8 ns Max Delay into $50 \mathrm{pF}, 9.6 \mathrm{~ns}$ into 200 pF (all Outputs Switching)
- PNP TTL Inputs for Low Loading
- $\mathrm{Pb}-$ Free Packages are Available*

ON Semiconductor ${ }^{\circledR}$
http://onsemi.com


PLCC-28
FN SUFFIX
CASE 776

## MARKING DIAGRAM*

| XXX | $=10$ or 100 |
| :--- | :--- |
| 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.

## MC10H601, MC100H601



Figure 1. PLCC-28 Pinout (Top View)

Table 1. PIN NAMES

| PIN | FUNCTION |
| :--- | :--- |
| GND | TTL Ground (0 V) |
| $\mathrm{V}_{\text {CCE }}$ | ECL $\mathrm{V}_{\text {CC }}(0 \mathrm{~V})$ |
| $\mathrm{V}_{\text {CCT }}$ | Supply (+5.0 V) |
| $\mathrm{V}_{\text {EE }}$ | ECL Supply ( $-5.2 /-4.5 \mathrm{~V}$ ) |
| D0-D8 | Data Inputs (ECL) |
| Q0-Q8 | Data Outputs (TTL) |
| OEECL | 3-State Control (ECL) |
| OETTL | 3-State Control (TTL) |

Table 2. TRUTH TABLE

| OEECL | OETTL | D | Q |
| :---: | :---: | :---: | :---: |
| L | L | L | L |
| L | L | H | H |
| H | X | X | Z |
| X | H | X | Z |



TTL

Figure 2. Logic Diagram

Table 3. 10H ECL DC CHARACTERISTICS: $V_{C C T}=5.0 \vee \pm 10 \% ; V_{E E}=-5.2 \mathrm{~V} \pm 5 \%$

| Symbol | Parameter | $0^{\circ} \mathrm{C}$ |  | $25^{\circ} \mathrm{C}$ |  | $85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Min | Max | Min | Max | Min | Max |  |
| $\mathrm{I}_{\text {EE }}$ | Power Supply Current |  | -51 |  | -51 |  | -51 | mA |
| $\begin{aligned} & \mathrm{l}_{\mathrm{INH}} \\ & \mathrm{I}_{\mathrm{INL}} \end{aligned}$ | Input HIGH Current Input LOW Current | 0.5 | 255 | 0.5 | 175 | 0.5 | 175 | $\begin{aligned} & \mu \mathrm{A} \\ & \mu \mathrm{~A} \end{aligned}$ |
| $\begin{aligned} & \mathrm{V}_{\mathrm{IH}} \\ & \mathrm{~V}_{\mathrm{IL}} \end{aligned}$ | Input HIGH Voltage Input LOW Voltage | $\begin{aligned} & -1170 \\ & -1950 \end{aligned}$ | $\begin{gathered} \hline-840 \\ -1480 \end{gathered}$ | $\begin{aligned} & -1130 \\ & -1950 \end{aligned}$ | $\begin{gathered} \hline-810 \\ -1480 \end{gathered}$ | $\begin{array}{\|l\|} \hline-1060 \\ -1950 \end{array}$ | $\begin{gathered} -720 \\ -1445 \end{gathered}$ | mV |

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 lfpm . 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.

Table 4. 100H ECL DC CHARACTERISTICS: $\mathrm{V}_{\mathrm{CCT}}=5.0 \mathrm{~V} \pm 10 \% ; \mathrm{V}_{\mathrm{EE}}=-4.2 \mathrm{~V}$ to -5.5 V

| Symbol | Parameter | $0^{\circ} \mathrm{C}$ |  | $25^{\circ} \mathrm{C}$ |  | $85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Min | Max | Min | Max | Min | Max |  |
| $\mathrm{I}_{\text {EE }}$ | Power Supply Current |  | -51 |  | -51 |  | -53 | mA |
| IINH $\operatorname{linL}$ | Input HIGH Current Input LOW Current | 0.5 | 255 | 0.5 | 175 | 0.5 | 175 | $\begin{aligned} & \mu \mathrm{A} \\ & u \mathrm{~A} \end{aligned}$ |
| $\begin{aligned} & \hline \mathrm{V}_{\mathrm{IH}} \\ & \mathrm{~V}_{\mathrm{IL}} \end{aligned}$ | Input HIGH Voltage Input LOW Voltage | $\begin{aligned} & -1165 \\ & -1810 \end{aligned}$ | $\begin{array}{\|c\|} \hline-880 \\ -1475 \end{array}$ | $\begin{aligned} & \hline-1165 \\ & -1810 \end{aligned}$ | $\begin{gathered} \hline-880 \\ -1475 \end{gathered}$ | $\begin{aligned} & -1165 \\ & -1810 \end{aligned}$ | $\begin{gathered} \hline-880 \\ -1475 \end{gathered}$ | mV |

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 lfpm. 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.

Table 5. TTL DC CHARACTERISTICS: $\mathrm{V}_{\mathrm{CCT}}=5.0 \mathrm{~V} \pm 10 \%$; $\mathrm{V}_{\mathrm{EE}}=-5.2 \mathrm{~V} \pm 5 \%$ ( 10 H version);
$\mathrm{V}_{\mathrm{EE}}=-4.2 \mathrm{~V}$ to -5.5 V ( 100 H version)

| Symbol | Parameter | Condition | $0^{\circ} \mathrm{C}$ |  | $25^{\circ} \mathrm{C}$ |  | $85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Min | Max | Min | Max | Min | Max |  |
| $\mathrm{I}_{\mathrm{CCH}}$ | Power Supply Current |  |  | 110 |  | 110 |  | 110 | mA |
| $\mathrm{I}_{\text {CCL }}$ |  |  |  | 110 |  | 110 |  | 110 |  |
| I CCz | Power Supply Current |  |  | 105 |  | 105 |  | 105 |  |
| $\mathrm{IIH}^{\text {H }}$ | Input HIGH Current | $\begin{aligned} & \mathrm{V}_{\mathrm{IN}}=2.7 \mathrm{~V} \\ & \mathrm{~V}_{\mathrm{IN}}=7.0 \mathrm{~V} \end{aligned}$ |  | $\begin{gathered} 20 \\ 100 \end{gathered}$ |  | $\begin{gathered} 20 \\ 100 \end{gathered}$ |  | $\begin{gathered} 20 \\ 100 \end{gathered}$ | $\mu \mathrm{A}$ |
| IIL | Input LOW Current | $\mathrm{V}_{\mathrm{IN}}=0.5 \mathrm{~V}$ |  | -0.6 |  | -0.6 |  | -0.6 | mA |
| Ios | Output Short Circuit Current | $\mathrm{V}_{\text {OUT }}=0 \mathrm{~V}$ | -100 | -225 | -100 | -225 | -100 | -225 | mA |
| $\begin{aligned} & \mathrm{I}_{\mathrm{OZH}} \\ & \mathrm{I}_{\mathrm{OZL}} \end{aligned}$ | Output Disable Current HIGH Output Disable Current LOW | $\begin{aligned} & \mathrm{V}_{\text {OUT }}=2.7 \mathrm{~V} \\ & \mathrm{~V}_{\text {OUT }}=0.5 \mathrm{~V} \end{aligned}$ | -50 | 50 | -50 | 50 | -50 | 50 | $\mu \mathrm{A}$ |
| $\begin{aligned} & \mathrm{V}_{\text {IHT }} \\ & \mathrm{V}_{\mathrm{ILT}} \end{aligned}$ | Input HIGH Voltage Input LOW Voltage |  | 2.0 | 0.8 | 2.0 | 0.8 | 2.0 | 0.8 | V |
| $\mathrm{V}_{\text {OHT }}$ | Output HIGH Voltage | $\begin{aligned} & \mathrm{I}_{\mathrm{OH}}=-3.0 \mathrm{~mA} \\ & \mathrm{I}_{\mathrm{OH}}=-15 \mathrm{~mA} \end{aligned}$ | $\begin{aligned} & 2.5 \\ & 2.0 \end{aligned}$ |  | $\begin{aligned} & 2.5 \\ & 2.0 \end{aligned}$ |  | $\begin{aligned} & 2.5 \\ & 2.0 \end{aligned}$ |  | V |
| $\mathrm{V}_{\text {OLT }}$ | Output LOW Voltage | $\mathrm{I}_{\mathrm{OL}}=48 \mathrm{~mA}$ |  | 0.55 |  | 0.55 |  | 0.55 | V |
| $\mathrm{V}_{\mathrm{IK}}$ | Input Clamp Voltage | $\mathrm{I}_{\mathrm{N}}=-18 \mathrm{~mA}$ |  | -1.2 |  | -1.2 |  | -1.2 | V |

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 lfpm. 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.

Table 6. AC CHARACTERISTICS: $\mathrm{V}_{\mathrm{CCT}}=5.0 \mathrm{~V} \pm 10 \% ; \mathrm{V}_{\mathrm{EE}}=-5.2 \mathrm{~V} \pm 5 \%$ ( 10 H version); $\mathrm{V}_{\mathrm{EE}}=-4.2 \mathrm{~V}$ to -5.5 V ( 100 H version)

| Symbol | Parameter |  | Condition | $0^{\circ} \mathrm{C}$ |  | $25^{\circ} \mathrm{C}$ |  | $85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Min | Max | Min | Max | Min | Max |  |
| $\begin{array}{\|l\|l} \hline \mathrm{t}_{\text {PLH }} \\ \mathrm{t}_{\mathrm{PHL}} \end{array}$ | Propagation Delay to Output |  |  | $\begin{gathered} \mathrm{C}_{\mathrm{L}}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ | $\begin{aligned} & 1.7 \\ & 3.4 \end{aligned}$ | $\begin{aligned} & \hline 4.8 \\ & 9.6 \end{aligned}$ | $\begin{aligned} & 1.7 \\ & 3.4 \end{aligned}$ | $\begin{aligned} & 4.8 \\ & 9.6 \end{aligned}$ | $\begin{aligned} & 1.7 \\ & 3.4 \end{aligned}$ | $\begin{aligned} & \hline 4.8 \\ & 9.6 \end{aligned}$ | $\begin{aligned} & \text { ns } \\ & \text { ns } \end{aligned}$ |
| $\begin{array}{\|l\|l} \hline \text { tpLZ } \\ \text { tpHz } \end{array}$ | Output Disable Time | $\overline{\text { OEECL }}$ | $\begin{gathered} \mathrm{C}_{\mathrm{L}}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ | $\begin{aligned} & 3.7 \\ & 5.4 \end{aligned}$ | $\begin{aligned} & 6.5 \\ & 13 \end{aligned}$ | $\begin{aligned} & 3.7 \\ & 5.4 \end{aligned}$ | $\begin{aligned} & 6.5 \\ & 13 \end{aligned}$ | $\begin{aligned} & 3.7 \\ & 5.4 \end{aligned}$ | $\begin{aligned} & 6.5 \\ & 13 \end{aligned}$ | $\begin{aligned} & \mathrm{ns} \\ & \mathrm{~ns} \end{aligned}$ |
| $\begin{array}{\|l\|l} \mathrm{t}_{\mathrm{PLZ}} \\ \mathrm{t}_{\mathrm{PHZ}} \end{array}$ |  | OETTL | $\begin{gathered} \mathrm{C}_{\mathrm{L}}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ | $\begin{aligned} & 4.3 \\ & 7.0 \end{aligned}$ | $\begin{aligned} & 7.5 \\ & 15 \end{aligned}$ | $\begin{aligned} & 4.3 \\ & 7.0 \end{aligned}$ | $\begin{aligned} & 7.5 \\ & 15 \end{aligned}$ | $\begin{aligned} & 4.3 \\ & 7.0 \end{aligned}$ | $\begin{aligned} & 7.5 \\ & 15 \end{aligned}$ | $\begin{aligned} & \text { ns } \\ & \text { ns } \end{aligned}$ |
| $\begin{array}{\|l\|l} \hline \mathrm{t}_{\text {PZL }} \\ \mathrm{t}_{\text {PZH }} \end{array}$ | Output Enable Time | OEECL | $\begin{gathered} \mathrm{C}_{\mathrm{L}}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ | $\begin{aligned} & 3.5 \\ & 5.0 \end{aligned}$ | $\begin{aligned} & \hline 6.0 \\ & 12 \end{aligned}$ | $\begin{aligned} & 3.5 \\ & 5.0 \end{aligned}$ | $\begin{aligned} & 6.0 \\ & 12 \end{aligned}$ | $\begin{aligned} & 3.5 \\ & 5.0 \end{aligned}$ | $\begin{aligned} & 6.0 \\ & 12 \end{aligned}$ | $\begin{aligned} & \mathrm{ns} \\ & \mathrm{~ns} \end{aligned}$ |
| $\begin{array}{\|l\|l} \hline \mathrm{t}_{\text {PZL }} \\ \mathrm{t}_{\text {PZH }} \end{array}$ |  | $\overline{\text { OETTL }}$ | $\begin{gathered} C_{L}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ | $\begin{aligned} & 4.2 \\ & 6.0 \end{aligned}$ | $\begin{gathered} 7.0 \\ 14 \end{gathered}$ | $\begin{aligned} & 4.2 \\ & 6.0 \end{aligned}$ | $\begin{aligned} & \hline 7.0 \\ & 14 \end{aligned}$ | $\begin{aligned} & 4.2 \\ & 6.0 \end{aligned}$ | $\begin{aligned} & 7.0 \\ & 14 \end{aligned}$ | $\begin{aligned} & \mathrm{ns} \\ & \mathrm{~ns} \end{aligned}$ |
| 郎 | $\begin{aligned} & \text { Output Rise/Fall Time } \\ & 1.0 \mathrm{~V}-2.0 \mathrm{~V} \end{aligned}$ |  | $\begin{gathered} C_{\mathrm{L}}=50 \mathrm{pF} \\ \mathrm{C}_{\mathrm{L}}=200 \mathrm{pF} \end{gathered}$ |  | $\begin{aligned} & 1.2 \\ & 3.0 \end{aligned}$ |  | $\begin{aligned} & 1.2 \\ & 3.0 \end{aligned}$ |  | $\begin{aligned} & 1.2 \\ & 3.0 \end{aligned}$ | $\begin{aligned} & \mathrm{ns} \\ & \mathrm{~ns} \end{aligned}$ |

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 lfpm. 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.

## ORDERING INFORMATION

| Device | Package | Shipping $^{\dagger}$ |
| :--- | :--- | :--- |
| MC10H601FN | PLCC-28 | 37 Units / Rail |
| MC10H601FNG | PLCC-28 <br> (Pb-Free) | 37 Units / Rail |
| MC10H601FNR2 | PLCC-28 | 500 / Tape \& Reel |
| MC10H601FNR2G | PLCC-28 <br> (Pb-Free) | $500 /$ Tape \& Reel |
| MC100H601FN | PLCC-28 | 37 Units / Rail |
| MC100H601FNG | PLCC-28 <br> (Pb-Free) | 37 Units / Rail |
| MC100H601FNR2 | PLCC-28 | 500 / Tape \& Reel |
| MC100H601FNR2G | PLCC-28 <br> (Pb-Free) | $500 /$ Tape \& Reel |

$\dagger$ 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.
Resource Reference of Application Notes
AN1405/D - ECL Clock Distribution Techniques
AN1406/D - Designing with PECL (ECL at +5.0 V)
AN1503/D - ECLinPS $^{m}$ I/O SPiCE Modeling Kit
AN1504/D - Metastability and the ECLinPS Family $^{\text {AN1568/D }- \text { Interfacing Between LVDS and ECL }}$
AN1672/D - The ECL Translator Guide
AND8001/D - Odd Number Counters Design
AND8002/D - Marking and Date Codes
AND8020/D - Termination of ECL Logic Devices
AND8066/D - Interfacing with ECLinPS
AND8090/D - AC Characteristics of ECL Devices

## MC10H601, MC100H601

## PACKAGE DIMENSIONS

## PLCC-28

FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 776-02
ISSUE E

notes

1. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE

MEASURED AT DATUM -T-, SEATING PLANE
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982 .
ANSI Y14.5M, 1982 .
6. 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 PROTRUSION(S) SHALL NOT CAUSE THE
DIMENSION TO BE GREATER THAN 0.037 DIMENSION TO BE GREATER THAN 0.037
$(0.940)$. THE DAMBAR INTRUSION(S) SHALL ( 0.940 ). THE DAMBAR INTRUSION(S) SH
NOT CAUSE THE H DIMENSION TO BE NOT CAUSE THE H DIMENSIO
SMALLER THAN $0.025(0.635)$.

|  | INCHES |  | MILLIMETERS |  |
| :---: | :---: | :---: | :---: | :---: |
| DIM | MIN | MAX | MIN | MAX |
| A | 0.485 | 0.495 | 12.32 | 12.57 |
| B | 0.485 | 0.495 | 12.32 | 12.57 |
| 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 | 1.27 |
| BSC | 0.026 | 0.032 | 0.66 | 0.81 |
| J | 0.020 | --- | 0.51 | --- |
| K | 0.025 | --- | 0.64 | --- |
| R | 0.450 | 0.456 | 11.43 | 11.58 |
| U | 0.450 | 0.456 | 11.43 | 11.58 |
| $\mathbf{V}$ | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| $\mathbf{X}$ | 0.042 | 0.056 | 1.07 | 1.42 |
| Y | --- | 0.020 | --- | 0.50 |
| $\mathbf{Z}$ | $2^{\circ}$ | $10^{\circ}$ | $2^{\circ}$ | $10^{\circ}$ |
| G1 | 0.410 | 0.430 | 10.42 | 10.92 |
| K1 | 0.040 | --- | 1.02 | --- |

## MC10H601, MC100H601

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