

# MC10H606, MC100H606

## Registered Hex TTL to PECL Translator

### Description

The MC10/100H606 is a 6-bit, registered, single supply TTL to PECL translator. The device features differential PECL outputs as well as a choice between either a differential PECL clock input or a TTL clock input. The asynchronous master reset control is a PECL level input.

With its differential PECL outputs and TTL inputs the H606 device is ideally suited for the transmit function of a HPPI bus type board-to-board interface application. The on chip registers simplify the task of synchronizing the data between the two boards.

The device is available in either ECL standard: the MECL 10H™ device is compatible with MECL 10KH logic levels, with a  $V_{CC}$  of +5.0 V while the 100H device is compatible with 100K logic levels, with a  $V_{CC}$  of +5.0 V.

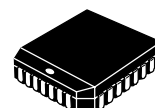
### Features

- Differential 50  $\Omega$  ECL Outputs
- Choice Between Differential PECL or TTL Clock Input
- Single Power Supply
- Multiple Power and Ground Pins to Minimize Noise
- Pb-Free Packages are Available\*



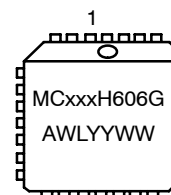
**ON Semiconductor®**

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**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

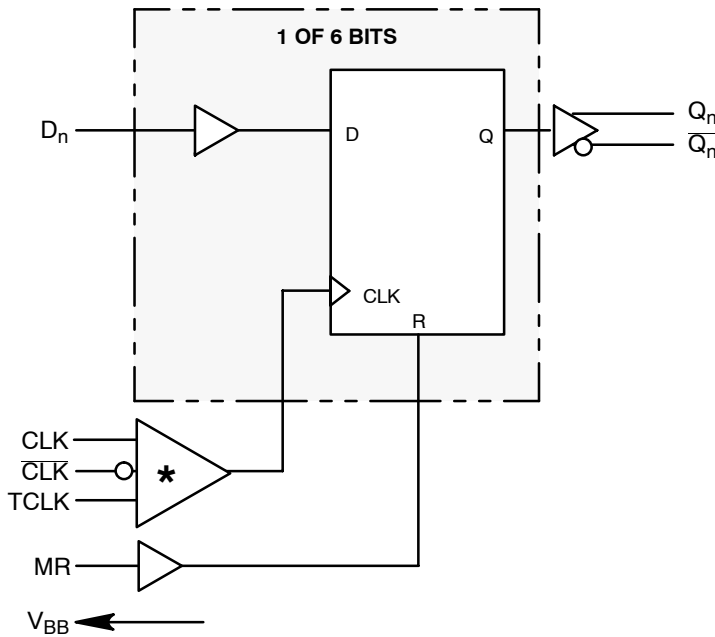
\*For additional marking information, refer to Application Note AND8002/D.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 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.

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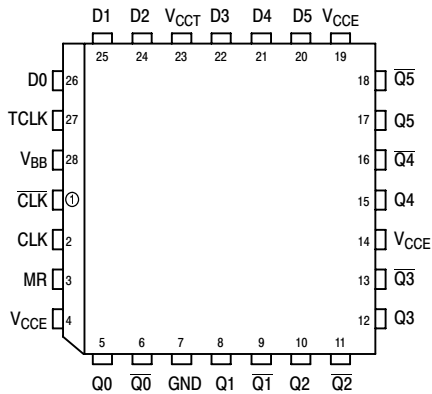
**Table 1. TRUTH TABLE**

D <sub>n</sub>	MR	TCLK/CLK	Q <sub>n+1</sub>
L	L	Z	L
H	L	Z	H
X	H	X	L

Z = LOW to HIGH Transition

- \* 1. When using PECL inputs, TCLK must be tied to ground (0 V).
- 2. When using only one PECL input, the unused PECL input must be tied to V<sub>BB</sub>, and TCLK must be tied to ground (0 V).
- 3. When using TCLK, both PECL inputs must be tied to ground (0 V).

**Figure 1. Logic Diagram**



**Figure 2. Pinout: PLCC-28  
(Top View)**

**Table 2. PIN NAMES**

PIN	FUNCTION
D0 - D5	TTL Data Inputs
CLK, CLK	Differential PECL Clock Input
TCLK	TTL Clock Input
MR	PECL Master Reset Input
Q0 - Q5	True PECL Outputs
Q0 - Q5	Inverted PECL Outputs
V <sub>CCE</sub>	PECL V <sub>CC</sub> (+5.0 V)
V <sub>CCT</sub>	TTL V <sub>CC</sub> (+5.0 V)
GND	TTL/PECL Ground

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**Table 3. 10H PECL DC CHARACTERISTICS** ( $V_{CCT} = V_{CCE} = 5.0\text{ V} \pm 5\%$ )

Symbol	Characteristic	Condition	$T_A = 0^\circ\text{C}$		$T_A = 25^\circ\text{C}$		$T_A = 85^\circ\text{C}$		Unit
			Min	Max	Min	Max	Min	Max	
$I_{INH}$	Input HIGH Current			255		175		175	$\mu\text{A}$
$I_{INL}$	Input LOW Current			0.5		0.5		0.5	$\mu\text{A}$
$V_{IH}$	Input HIGH Voltage (Note 4)	$V_{CCT} = 5.0\text{ V}$	3830	4160	3870	4190	3930	4280	mV
$V_{IL}$	Input LOW Voltage (Note 4)	$V_{CCT} = 5.0\text{ V}$	3050	3520	3050	3520	3050	3555	mV
$V_{OH}$	Output HIGH Voltage (Note 4)	$V_{CCT} = 5.0\text{ V}$	3980	4160	4020	4190	4080	4270	mV
$V_{OL}$	Output LOW Voltage (Note 4)	$V_{CCT} = 5.0\text{ V}$	3050	3370	3050	3370	3050	3400	mV
$V_{BB}$	Reference Voltage (Note 4)	$V_{CCT} = 5.0\text{ V}$	3600	3710	3630	3730	3670	3790	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 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. PECL  $V_{IL}$ ,  $V_{IH}$ ,  $V_{OL}$ ,  $V_{OH}$   $V_{BB}$  are given for  $V_{CCT} = V_{CCE} = 5.0\text{ V}$  and will vary 1:1 with the power supply.

**Table 4. 100H PECL DC CHARACTERISTICS** ( $V_{CCT} = V_{CCE} = 5.0\text{ V} \pm 5\%$ )

Symbol	Characteristic	Condition	$T_A = 0^\circ\text{C}$		$T_A = 25^\circ\text{C}$		$T_A = 85^\circ\text{C}$		Unit
			Min	Max	Min	Max	Min	Max	
$I_{INH}$	Input HIGH Current			255		175		175	$\mu\text{A}$
$I_{INL}$	Input LOW Current			0.5		0.5		0.5	$\mu\text{A}$
$V_{IH}$	Input HIGH Voltage (Note 5)	$V_{CCT} = 5.0\text{ V}$	3835	4120	3835	4120	3835	4120	mV
$V_{IL}$	Input LOW Voltage (Note 5)	$V_{CCT} = 5.0\text{ V}$	3190	3525	3190	3525	3190	3525	mV
$V_{OH}$	Output HIGH Voltage (Note 5)	$V_{CCT} = 5.0\text{ V}$	3975	4120	3975	4120	3975	4120	mV
$V_{OL}$	Output LOW Voltage (Note 5)	$V_{CCT} = 5.0\text{ V}$	3190	3380	3190	3380	3190	3380	mV
$V_{BB}$	Output Bias Voltage (Note 5)	$V_{CCT} = 5.0\text{ V}$	3600	3720	3600	3720	3600	3720	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 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.

5. PECL  $V_{IL}$ ,  $V_{IH}$ ,  $V_{OL}$ ,  $V_{OH}$   $V_{BB}$  are given for  $V_{CCT} = V_{CCE} = 5.0\text{ V}$  and will vary 1:1 with the power supply.

**Table 5. DC CHARACTERISTICS** ( $V_{CCT} = V_{CCE} = 5.0\text{ V} \pm 5\%$ )

Symbol	Characteristic	Condition	$T_A = 0^\circ\text{C}$			$T_A = +25^\circ\text{C}$			$T_A = +85^\circ\text{C}$			Unit
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{CCL}$	Supply Current	Outputs LOW		18	30		18	30		18	30	mA
$I_{CCH}$	Supply Current	Outputs HIGH		13	25		13	25		13	25	mA
$I_{GND}$	Supply Current			75	90		75	90		75	95	mA

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.

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**Table 6. TTL DC CHARACTERISTICS** ( $V_{CCT} = V_{CCE} = 5.0\text{ V} \pm 5\%$ )

Symbol	Characteristic	Condition	$T_A = 0^\circ\text{C}$		$T_A = 25^\circ\text{C}$		$T_A = 85^\circ\text{C}$		Unit
			Min	Max	Min	Max	Min	Max	
$V_{IH}$	Input HIGH Voltage		2.0		2.0		2.0		V
$V_{IL}$	Input LOW Voltage			0.8		0.8		0.8	V
$V_{IK}$	Input Clamp Voltage	$I_{IN} = -18\text{ mA}$		-1.2		-1.2		-1.2	V
$I_{IH}$	Input HIGH Current	$V_{IN} = 2.7\text{ V}$ $V_{IN} = 7.0\text{ V}$		20 100		20 100		20 100	V
$I_{IL}$	Input LOW Current	$V_{IN} = 0.5\text{ V}$		-0.6		-0.6		-0.6	mA

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 7. AC CHARACTERISTICS** ( $V_{CCT} = V_{CCE} = 5.0\text{ V} \pm 5\%$ )

Symbol	Characteristic	Condition	$T_A = 0^\circ\text{C}$			$T_A = +25^\circ\text{C}$			$T_A = +85^\circ\text{C}$			Unit
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$t_{PD}$	Propagation Delay TCLK++	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.75		3.75	1.75	3.00	3.75	1.75		3.75	ns
$t_{PD}$	Propagation Delay TCLK+-	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.75		3.75	1.75	3.00	3.75	1.75		3.75	ns
$t_{PD}$	Propagation Delay CLK++	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.50		3.50	1.50	2.50	3.50	1.50		3.50	ns
$t_{PD}$	Propagation Delay CLK+-	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.50		3.50	1.50	2.50	3.50	1.50		3.50	ns
$t_{PD}$	Propagation Delay MR+-	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.50		3.50	1.50	2.50	3.50	1.75		3.75	ns
$t_{SKEW}$	Device Skew Part-to-Part Within Device	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$			2.0 0.5		1.0 0.3	2.0 0.5			2.0 0.5	ns
$t_S$	Setup Time	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.5	0.5		1.5	0.5		1.5	0.5		ns
$t_H$	Hold Time	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.5	0.5		1.5	0.5		1.5	0.5		ns
$t_{PW}$	Minimum Pulse Width CLK	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.5			1.5	1.0		1.5			ns
$t_{PW}$	Minimum Pulse Width MR	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	1.5			1.5			1.5			ns
$t_r$	Rise Time	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$			2.0		1.0	2.0			2.0	ns
$t_f$	Fall Time	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$			2.0		1.0	2.0			2.0	ns
$t_{RES/REC}$	Reset/Recovery Time	$50\ \Omega$ to $V_{CC}-2.0\text{ V}$	2.5	2.0		2.5	2.0		2.5	2.0		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 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.

## MC10H606, MC100H606

### ORDERING INFORMATION

Device	Package	Shipping†
MC10H606FN	PLCC-28	37 Units / Rail
MC10H606FNG	PLCC-28 (Pb-Free)	37 Units / Rail
MC10H606FNR2	PLCC-28	500 / Tape & Reel
MC10H606FNR2G	PLCC-28 (Pb-Free)	500 / Tape & Reel
MC100H606FN	PLCC-28	37 Units / Rail
MC100H606FNG	PLCC-28 (Pb-Free)	37 Units / Rail

†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.

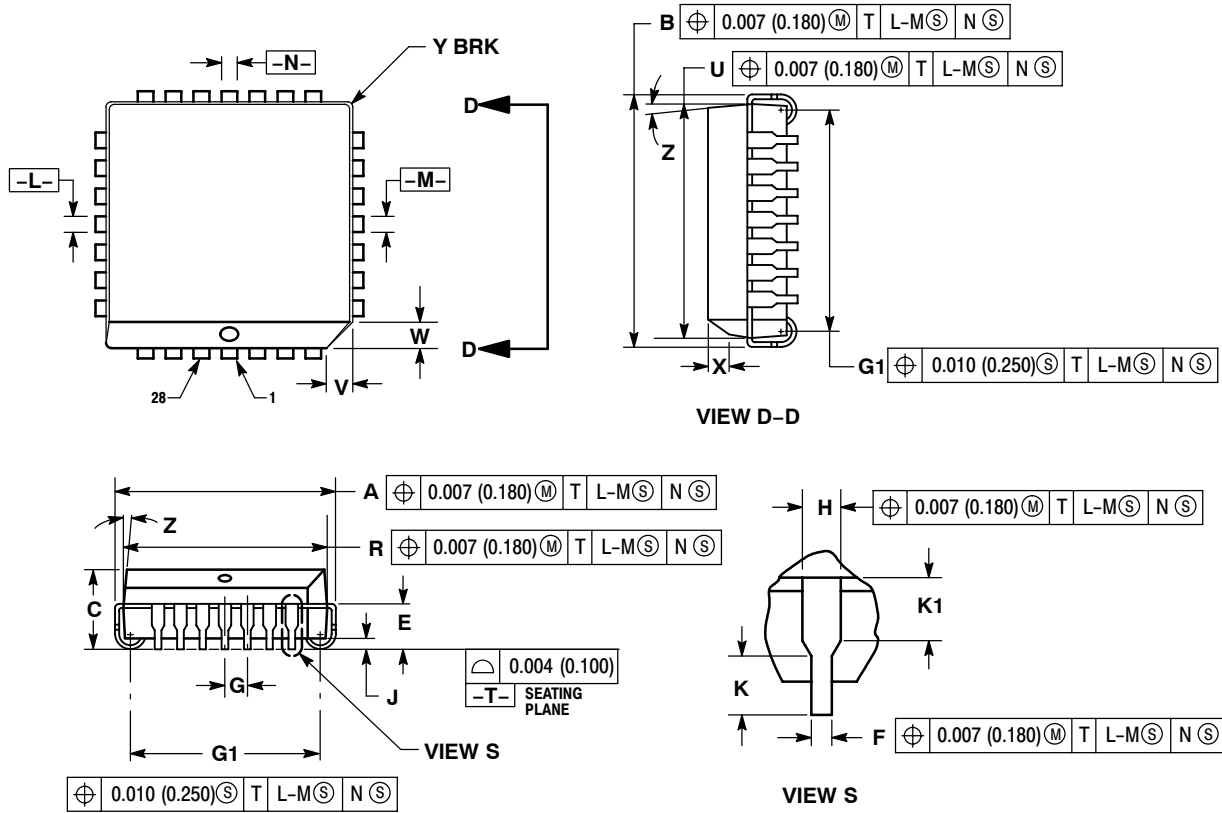
### Resource Reference of Application Notes

- AN1405/D** - ECL Clock Distribution Techniques
- AN1406/D** - Designing with PECL (ECL at +5.0 V)
- AN1503/D** - ECLinPS™ I/O SPiCE Modeling Kit
- AN1504/D** - Metastability and the ECLinPS Family
- AN1568/D** - 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

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## PACKAGE DIMENSIONS

PLCC-28  
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 776-02  
ISSUE E




**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 BOTTOM MAY BE SMALLER THAN THE PACKAGE TOP 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	0.485	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 BSC	
H	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
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	0.410	0.430	10.42	10.92
K1	0.040	---	1.02	---

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