

## FEATURES

- 3.3V power supply
- PECL-to-TTL version of popular ECLinPS E111
- Guaranteed low skew specification
- Latched input
- Differential ECL internal design
- VBB output for single-ended operation
- Reset/enable
- Extra TTL and ECL power/ground pins
- Choice of ECL compatibility: MECL 10KH (10Hxxx) or 100K (100Hxxx)
- Available in 28-pin PLCC package

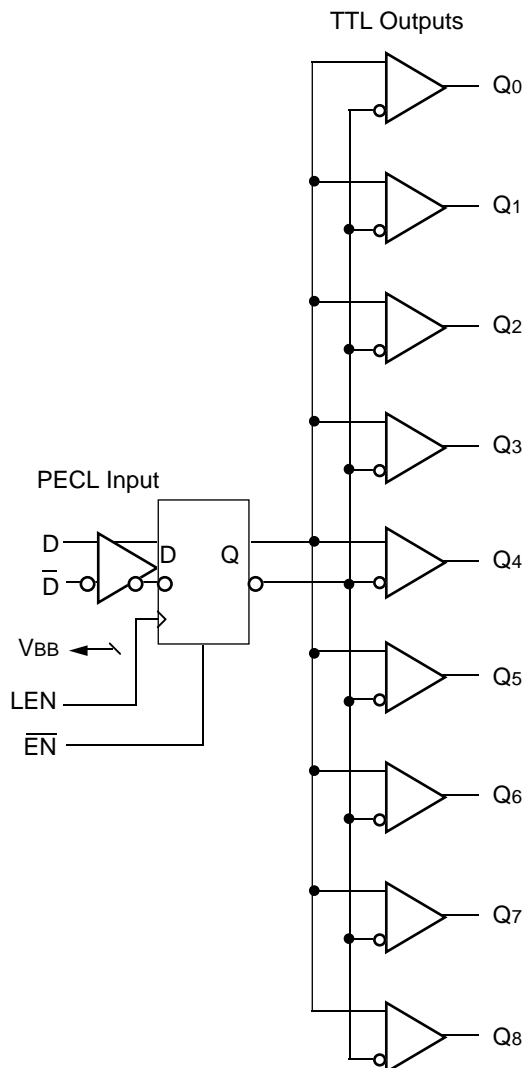
## DESCRIPTION

The SY10/100H641L are single supply, low skew translating 1:9 clock drivers. Devices in the Micrel-Synergy H600 translator series utilize the 28-lead PLCC for optimal power pinning, signal flow-through and electrical performance.

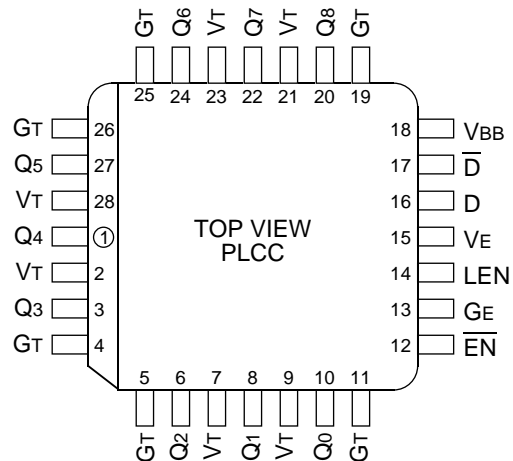
The devices feature a 24mA TTL output stage with AC performance specified into a 20pF load capacitance. A latch is provided on-chip. When LEN is LOW (or left open, in which case it is pulled LOW by the internal pull-downs), the latch is transparent. A HIGH on the enable pin (/EN) forces all outputs LOW.

The 10H version is compatible with MECL 10KH ECL logic levels. The 100H version is compatible with 100K levels.

## BLOCK DIAGRAM



## PIN CONFIGURATION



## PIN NAMES

Pin	Function
GT	TTL Ground (0V)
VT	TTL Vcc (+3.0V)
VE	ECL Vcc (+3.0V)
GE	ECL Ground (0V)
D, /D	Signal Input (PECL)
VBB	VBB Reference Output (PECL)
Q0 – Q8	Signal Outputs (TTL)
/EN	Enable Input (PECL)
LEN	Latch Enable Input (PECL)

## ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

Symbol	Rating	Value	Unit
V <sub>E</sub> (ECL) V <sub>T</sub> (TTL)	Power Supply Voltage	-0.5 to +7.0 -0.5 to +7.0	V
V <sub>I</sub> (ECL)	Input Voltage	0.0 to V <sub>E</sub>	V
V <sub>OUT</sub> (TTL)	Disabled 3-State Output	0.0 to V <sub>T</sub>	V
I <sub>OUT</sub> (ECL)	Output Current - Continuous - Surge	50 100	mA
T <sub>store</sub>	Storage Temperature	-65 to +150	°C
T <sub>A</sub>	Operating Temperature	0 to +85	°C

**NOTE:**

- Do not exceed.

## TRUTH TABLE

D	LEN	/EN	Q
L	L	L	L
H	L	L	H
X	H	L	Q <sub>0</sub>
X	X	H	L

## DC ELECTRICAL CHARACTERISTICS

V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

Symbol	Parameter	T <sub>A</sub> = 0°C		T <sub>A</sub> = +25°C		T <sub>A</sub> = +85°C		Unit	Condition	
		Min.	Max.	Min.	Max.	Min.	Max.			
I <sub>EE</sub>	Power Supply Current	ECL	—	30	—	30	—	30	mA	V <sub>E</sub> Pin
I <sub>CC</sub> H		TTL	—	30	—	30	—	30		Total all V <sub>T</sub> pins
I <sub>CC</sub> L		—	35	—	35	—	35			

## TTL DC ELECTRICAL CHARACTERISTICS

V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

Symbol	Parameter	T <sub>A</sub> = 0°C		T <sub>A</sub> = +25°C		T <sub>A</sub> = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
V <sub>OH</sub>	Output HIGH Voltage	2.0	—	2.0	—	2.0	—	V	I <sub>OH</sub> = -3.0mA
V <sub>OL</sub>	Output LOW Voltage	—	0.5	—	0.5	—	0.5	V	I <sub>OL</sub> = 24mA
I <sub>OS</sub>	Output Short Circuit Current	-100	—	-100	—	-100	—	mA	V <sub>OUT</sub> = 0V

## 10H ECL DC ELECTRICAL CHARACTERISTICS

V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

Symbol	Parameter	T <sub>A</sub> = 0°C		T <sub>A</sub> = +25°C		T <sub>A</sub> = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
I <sub>IH</sub>	Input HIGH Current	—	225	—	175	—	175	μA	—
I <sub>IL</sub>	Input LOW Current	0.5	—	0.5	—	0.5	—	μA	—
V <sub>IH</sub>	Input HIGH Voltage <sup>(1)</sup>	2.130	2.460	2.170	2.490	2.240	2.580	V	V <sub>E</sub> = 3.3V
V <sub>IL</sub>	Input LOW Voltage <sup>(1)</sup>	1.350	1.820	1.350	1.820	1.350	1.855	V	V <sub>E</sub> = 3.3V
V <sub>BB</sub>	Output Reference Voltage <sup>(1)</sup>	1.920	2.030	1.950	2.050	1.990	2.110	V	V <sub>E</sub> = 3.3V

**NOTE:**

- V<sub>IH</sub>, V<sub>IL</sub> and V<sub>BB</sub> are referenced to V<sub>E</sub> and will vary 1:1 with the power supply. The levels shown are for V<sub>E</sub> = +3.3V.

## 100H ECL DC ELECTRICAL CHARACTERISTICS

$V_T = V_E = +3.0V$  to  $+3.6V$

Symbol	Parameter	$T_A = 0^\circ C$		$T_A = +25^\circ C$		$T_A = +85^\circ C$		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
$I_{IH}$	Input HIGH Current	—	225	—	175	—	175	$\mu A$	—
$I_{IL}$	Input LOW Current	0.5	—	0.5	—	0.5	—	$\mu A$	—
$V_{IH}$	Input HIGH Voltage <sup>(1)</sup>	2.135	2.420	2.135	2.420	2.135	2.420	V	$V_E = 3.3V$
$V_{IL}$	Input LOW Voltage <sup>(1)</sup>	1.490	1.825	1.490	1.825	1.490	1.825	V	$V_E = 3.3V$
$V_{BB}$	Output Reference Voltage <sup>(1)</sup>	1.920	2.040	1.920	2.040	1.920	2.040	V	$V_E = 3.3V$

**NOTE:**

1.  $V_{IH}$ ,  $V_{IL}$  and  $V_{BB}$  are referenced to  $V_E$  and will vary 1:1 with the power supply. The levels shown are for  $V_E = +3.3V$ .

## AC ELECTRICAL CHARACTERISTICS

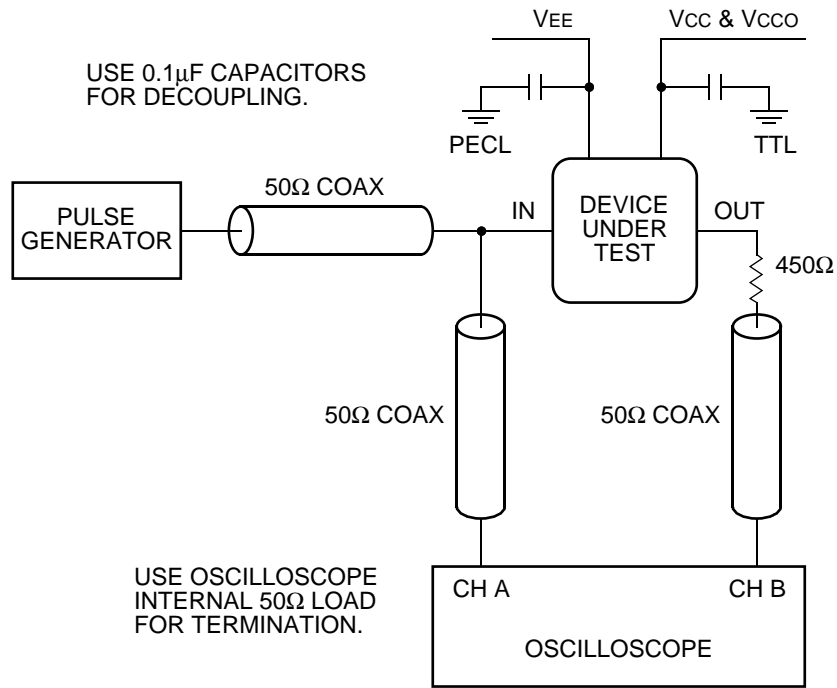
$V_T = V_E = +3.0V$  to  $+3.6V$

Symbol	Parameter	$T_A = 0^\circ C$		$T_A = +25^\circ C$		$T_A = +85^\circ C$		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
$t_{PLH}$ $t_{PHL}$	Propagation Delay D to Output	2.0 2.5	3.0 3.5	2.0 2.5	3.0 3.5	2.0 2.5	3.0 3.5	ns	$C_L = 20pF$
$t_{skpp}$	Part-to-Part Skew <sup>(1,4)</sup>	—	0.5	—	0.5	—	0.5	ns	$C_L = 20pF$
$t_{skew++}$ $t_{skew--}$	Within-Device Skew <sup>(2,3,4)</sup>	— —	0.3 <sup>(7)</sup> 0.35 <sup>(8)</sup>	— —	0.3 <sup>(7)</sup> 0.35 <sup>(8)</sup>	— —	0.3 <sup>(7)</sup> 0.35 <sup>(8)</sup>	ns ns	$C_L = 20pF$ $C_L = 20pF$
$t_{PLH}$ $t_{PHL}$	Propagation Delay LEN to Output	2.0	3.5	2.0	3.5	2.0	3.5	ns	$C_L = 20pF$
$t_{PLH}$ $t_{PHL}$	Propagation Delay /EN to Output	2.0	3.5	2.0	3.5	2.0	3.5	ns	$C_L = 20pF$
$t_r$ $t_f$	Output Rise/Fall Time 1.0V to 2.0V	— —	1.7 1.6	— —	1.7 1.6	— —	1.7 1.6	ns	$C_L = 20pF$
$f_{MAX}$	Maximum Input Frequency <sup>(5,6)</sup>	135	—	135	—	135	—	MHz	
—	Pulse Width	1.5	—	1.5	—	1.5	—	ns	—
—	Recovery Time	1.25	—	1.25	—	1.25	—	ns	—
$t_S$	Set-up Time	0.5 (typ.)		0.5 (typ.)		0.5 (typ.)		ns	—
$t_H$	Hold Time	0.5 (typ.)		0.5 (typ.)		0.5 (typ.)		ns	—

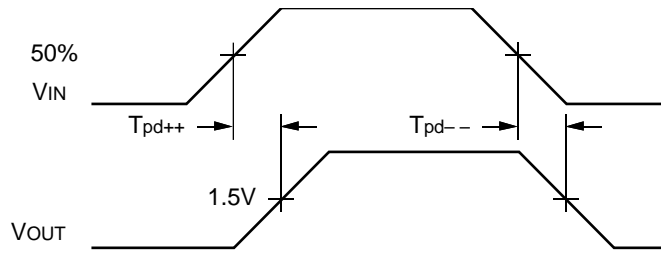
**NOTES:**

1. Device-to-Device Skew considering HIGH-to-HIGH transitions at common  $V_{CC}$  level.
2. Within-Device Skew considering HIGH-to-HIGH transitions at common  $V_{CC}$  level.
3. Within-Device Skew considering LOW-to-LOW transitions at common  $V_{CC}$  level.
4. All skew parameters are guaranteed but not tested.
5. Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.
6. The  $f_{MAX}$  value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.
7.  $V_T = V_E = +3.15V$  to  $+3.45V$ , (i.e.  $V_E \pm 5\%$ ).
8.  $V_T = V_E = +3.0V$  to  $+3.6V$ , (i.e.  $V_E \pm 10\%$ ).

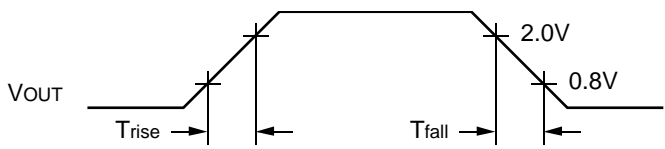
**TTL SWITCHING CIRCUIT**



**ECL/TTL PROPAGATION DELAY — SINGLE ENDED**



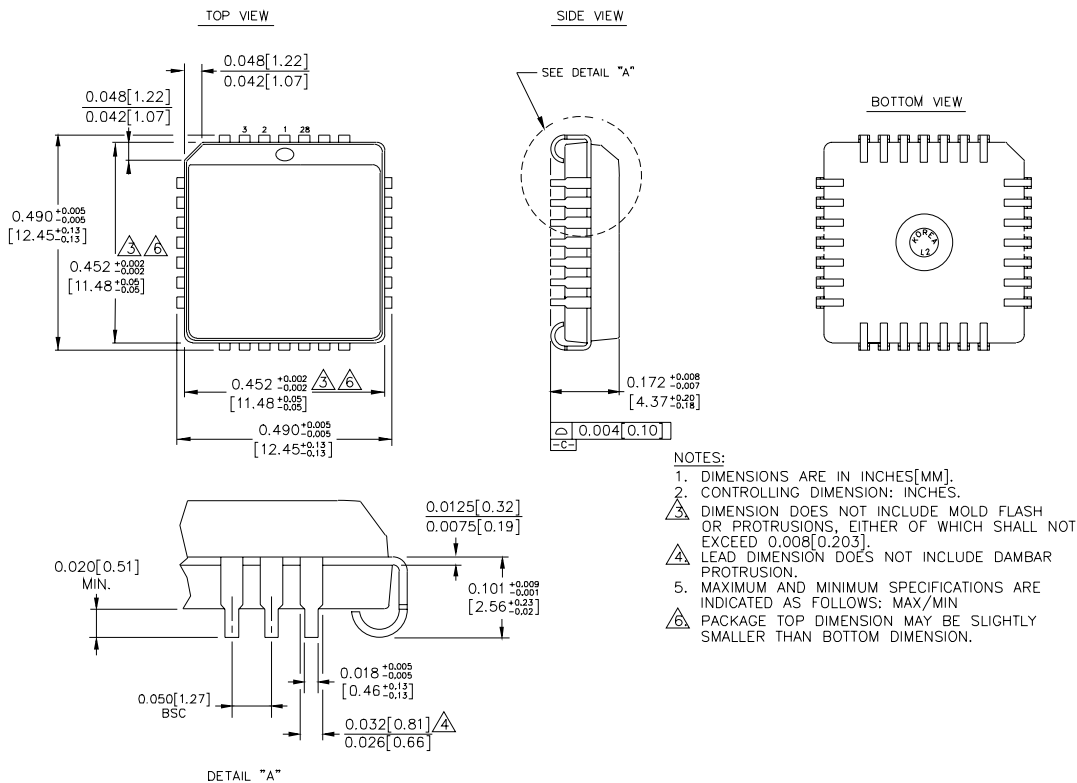
**ECL/TTL WAVEFORMS: RISE AND FALL TIMES**



**PRODUCT ORDERING CODE**

Ordering Code	Package Type	Operating Range
SY10H641LC	J28-1	Commercial
SY10H641LJCTR	J28-1	Commercial
SY100H641LJC	J28-1	Commercial
SY100H641LJCTR	J28-1	Commercial

**28 LEAD PLCC (J28-1)**



Rev. 03

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