

**FEATURES**

- Input frequencies up to 135MHz
- PECL-to-TTL version of popular ECLinPS E111
- Guaranteed low skew specification
- Latched input
- Differential internal design
- VBB output VECL for single-ended operation
- Single +5V supply
- 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



Precision Edge®

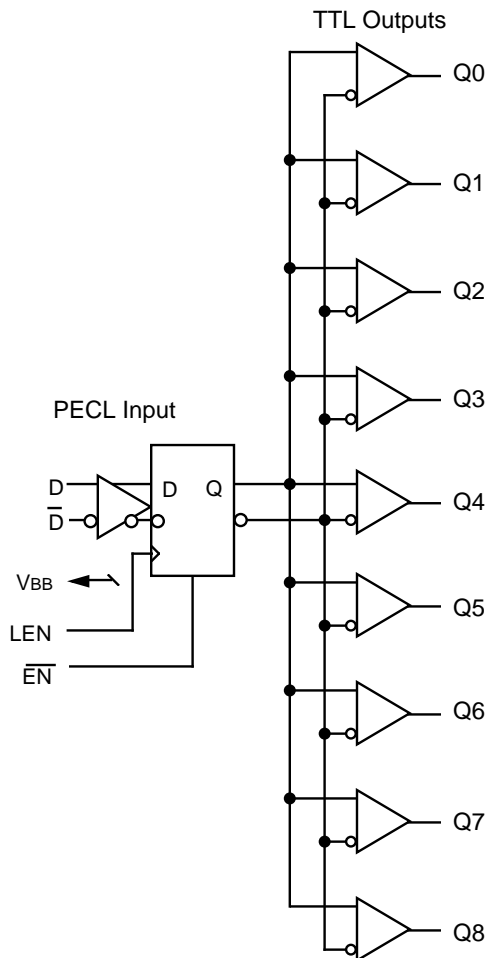
**DESCRIPTION**

The SY10/100H641 are single supply, low skew translating 1:9 clock drivers. Devices in the Micrel 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 50pF 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 ( $\overline{EN}$ ) forces all outputs LOW.

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

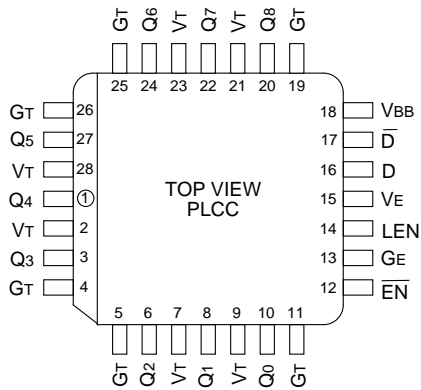
**BLOCK DIAGRAM**



**PIN NAMES**

Pin	Function
GT	TTL Ground (0V)
VT	TTL Vcc (+5.0V)
VE	ECL Vcc (+5.0V)
GE	ECL Ground (0V)
D, $\overline{D}$	Signal Input (PECL)
VBB	VBB Reference Output (PECL)
Q0 - Q8	Signal Outputs (TTL)
$\overline{EN}$	Enable Input (PECL)
LEN	Latch Enable Input (PECL)

**PACKAGE/ORDERING INFORMATION**



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

**Ordering Information<sup>(1)</sup>**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10H641JC	J28-1	Commercial	SY10H641JC	Sn-Pb
SY10H641JCTR <sup>(2)</sup>	J28-1	Commercial	SY10H641JC	Sn-Pb
SY100H641JC	J28-1	Commercial	SY100H641JC	Sn-Pb
SY100H641JCTR <sup>(2)</sup>	J28-1	Commercial	SY100H641JC	Sn-Pb
SY10H641JZ <sup>(3)</sup>	J28-1	Commercial	SY10H641JZ with Pb-Free bar-line indicator	Matte-Sn
SY10H641JZTR <sup>(2, 3)</sup>	J28-1	Commercial	SY10H641JZ with Pb-Free bar-line indicator	Matte-Sn
SY100H641JZ <sup>(3)</sup>	J28-1	Commercial	SY100H641JZ with Pb-Free bar-line indicator	Matte-Sn
SY100H641JZTR <sup>(2, 3)</sup>	J28-1	Commercial	SY100H641JZ with Pb-Free bar-line indicator	Matte-Sn

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at T<sub>A</sub> = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

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

Symbol	Rating	Value	Unit
VE (ECL) VT (TTL)	Power Supply Voltage	-0.5 to +7.0 -0.5 to +7.0	V
VI (ECL)	Input Voltage	0.0 to VEE	V
VOUT (TTL)	Disabled 3-State Output	0.0 to VCC	V
IOUT (ECL)	Output Current - Continuous - Surge	50 100	mA
TLEAD	Lead Temperature Range (soldering, 20sec)	+260	°C
Tstore	Storage Temperature	-65 to +150	°C
TA	Operating Temperature	0 to +85	°C

**Note:**

1. Do not exceed.

### TRUTH TABLE

D	LEN	EN	Q
L	L	L	L
H	L	L	H
X	H	L	Q0
X	X	H	L

### VCC AND CLOAD

Ranges to meet duty cycle requirement: 0°C ≤ TA ≤ 85°C. Output duty cycle measured relative to 1.5V.

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition	
PW1	Ranges of VCC and CL to meet min. pulse width (HIGH or LOW) at fOUT ≤ 40MHz	VCC	4.75	5.0	5.25	V	All Outputs
		CL	10	—	50	pF	
		Pw	11	—	—	ns	
PW2	Ranges of VCC and CL to meet min. pulse width (HIGH or LOW) at fOUT ≤ 50MHz	VCC	4.875	5.0	5.125	V	All Outputs
		CL	15	—	27	pF	
		Pw	9.0	—	—	ns	

### DC ELECTRICAL CHARACTERISTICS

VT = VE = 5.0V ± 5%

Symbol	Parameter		TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
			Min.	Max.	Min.	Max.	Min.	Max.		
IEE	Power Supply Current	ECL	—	30	—	30	—	30	mA	VE Pin
ICCH		TTL	—	30	—	30	—	30		Total all VT pins
ICCL			—	35	—	35	—	35		

### TTL DC ELECTRICAL CHARACTERISTICS

VT = VE = 5.0V ± 5%

Symbol	Parameter	TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
VOH	Output HIGH Voltage	2.0	—	2.0	—	2.0	—	V	IOH = -15mA
VOL	Output LOW Voltage	—	0.5	—	0.5	—	0.5	V	IOL = 24mA
Ios	Output Short Circuit Current	-100	-225	-100	-225	-100	-225	mA	VOUT = 0V

### 10H ECL DC ELECTRICAL CHARACTERISTICS

$V_T = V_E = 5.0V \pm 5\%$

Symbol	Parameter	TA = 0°C		TA = +25°C		TA = +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>	3.830	4.160	3.870	4.190	3.940	4.280	V	V <sub>E</sub> = 5.0V
V <sub>IL</sub>	Input LOW Voltage <sup>(1)</sup>	3.050	3.520	3.050	3.520	3.050	3.555	V	V <sub>E</sub> = 5.0V
V <sub>BB</sub>	Output Reference Voltage <sup>(1)</sup>	3.620	3.730	3.650	3.750	3.690	3.810	V	V <sub>E</sub> = 5.0V

**Note:**

1. 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> = +5.0V.

### 100H ECL DC ELECTRICAL CHARACTERISTICS

$V_T = V_E = 5.0V \pm 5\%$

Symbol	Parameter	TA = 0°C		TA = +25°C		TA = +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>	3.835	4.120	3.835	4.120	3.835	4.120	V	V <sub>E</sub> = 5.0V
V <sub>IL</sub>	Input LOW Voltage <sup>(1)</sup>	3.190	3.525	3.190	3.525	3.190	3.525	V	V <sub>E</sub> = 5.0V
V <sub>BB</sub>	Output Reference Voltage <sup>(1)</sup>	3.620	3.740	3.620	3.740	3.620	3.740	V	V <sub>E</sub> = 5.0V

**Note:**

1. 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> = +5.0V.

### AC ELECTRICAL CHARACTERISTICS

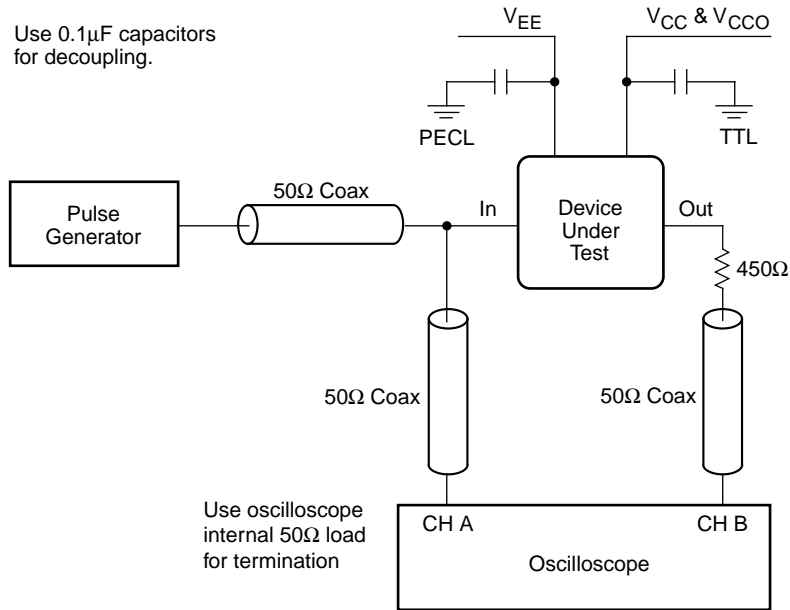
$V_T = V_E = 5.0V \pm 5\%$

Symbol	Parameter	TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
t <sub>PD</sub>	Propagation Delay D to Output	5.0	6.0	4.8	5.8	5.3	6.3	ns	CL = 50pF
t <sub>skpp</sub>	Part-to-Part Skew <sup>(1,4)</sup>	—	1.0	—	1.0	—	1.0	ns	CL = 50pF
t <sub>skew++</sub>	Within-Device Skew <sup>(2,4)</sup>	—	0.5	—	0.5	—	0.5	ns	CL = 50pF
t <sub>skew--</sub>	Within-Device Skew <sup>(3,4)</sup>	—	0.5	—	0.5	—	0.5	ns	CL = 50pF
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay LEN to Output	4.9	6.9	4.9	6.9	5.0	7.0	ns	CL = 50pF
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay EN to Output	5.0	7.0	4.9	6.9	5.0	7.0	ns	CL = 50pF
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Time 0.8V to 2.0V	—	1.7	—	1.7	—	1.7	ns	CL = 50pF
f <sub>MAX</sub>	Maximum Input Frequency <sup>(5,6)</sup>	135	—	135	—	135	—	MHz	CL = 50pF
—	Pulse Width	1.5	—	1.5	—	1.5	—	ns	—
—	Recovery Time	1.25	—	1.25	—	1.25	—	ns	—
t <sub>S</sub>	Set-up Time	0.5 (typ.)		0.5 (typ.)		0.5 (typ.)		ns	—
t <sub>H</sub>	Hold Time	0.5 (typ.)		0.5 (typ.)		0.5 (typ.)		ns	—

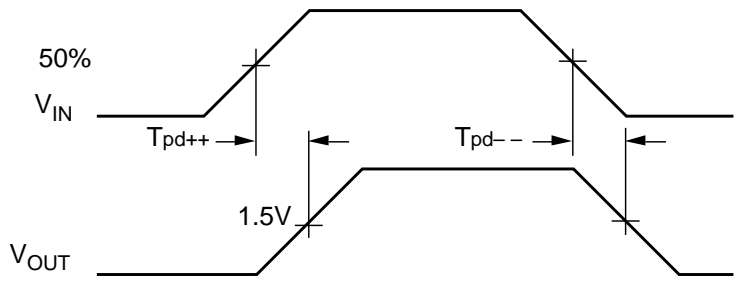
**Notes:**

- Device-to-Device Skew considering HIGH-to-HIGH transitions at common power supply voltage.
- Within-Device Skew considering HIGH-to-HIGH transitions at common power supply voltage.
- Within-Device Skew considering LOW-to-LOW transitions at common power supply voltage.
- All skew parameters are guaranteed but not tested.
- Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.
- The f<sub>MAX</sub> value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

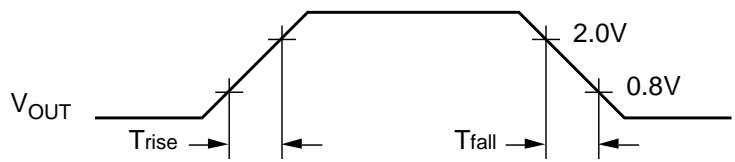
**TTL SWITCHING CIRCUIT**



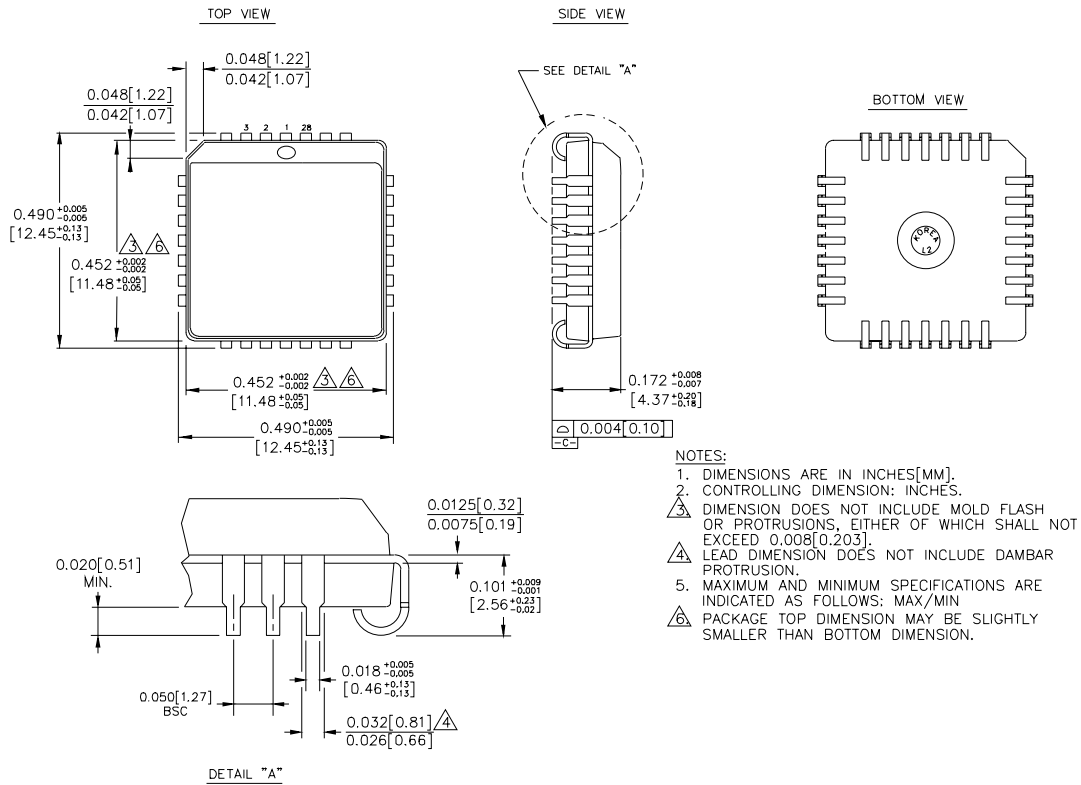
**ECL/TTL PROPAGATION DELAY — SINGLE ENDED**



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



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



Rev. 03

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