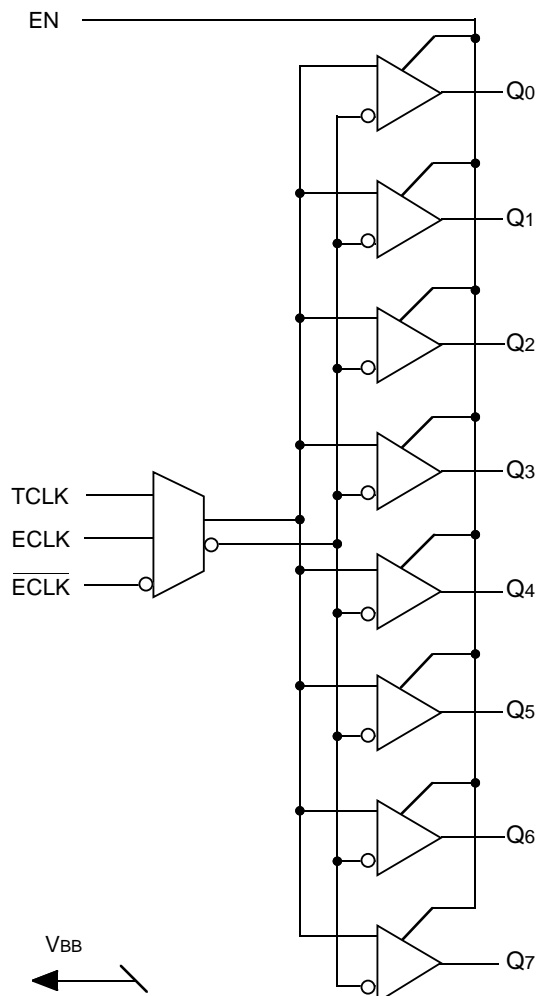


## FEATURES

- 3.3V power supply
- PECL/TTL-to-TTL version of popular ECLinPS E111AE/LE
- Guaranteed low skew specification
- Three-state enable
- Differential internal design
- VBB output for single-ended operation
- Extra TTL and ECL power/ground pins
- Choice of ECL compatibility: 10K or 100K
- Matched high and low output impedance
- Available in 28-pin PLCC package

## BLOCK DIAGRAM



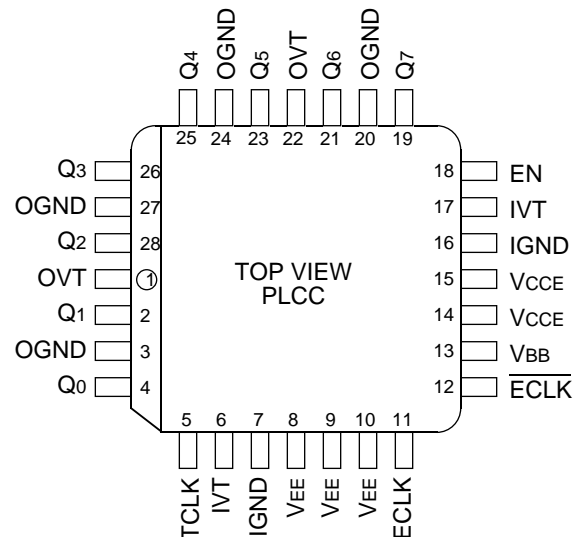
## DESCRIPTION

The SY10/100H646L are single supply, low skew translating 1:8 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 single supply H646L is similar to the HA643 which is a dual supply 1:8 version of the same function.

These devices feature a 24mA TTL output stage, with AC performance specified into a 20pF load capacitance.

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

## PIN CONFIGURATION



## PIN NAMES

Pin	Function
OGND	TTL Output Ground (0V)
OVT	TTL Output Vcc (+3.0V)
IGND	Internal TTL GND (0V)
IVT	Internal TTL Vcc (+3.0V)
VEE	ECL VEE (0V)
VCC	ECL Ground (+3.0V)
ECLK, ECLK	Differential Signal Input (PECL)
VBB	VBB Reference Output
Q0-Q7	Signal Outputs (TTL)
EN	Three-State Enable Input (TTL)
TCLK	Signal Input (TTL)

### 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) V <sub>I</sub> (TTL)	Input Voltage	0.0 to V <sub>EE</sub> -0.5 to V <sub>CC</sub>	V
V <sub>OUT</sub> (TTL)	Disabled 3-State Output	0.0 to V <sub>CC</sub> T	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

TCLK	ECLK	$\overline{\text{ECLK}}$	EN	Q
GND	L	H	H	L
GND	H	L	H	H
H	GND	GND	H	H
L	GND	GND	H	L
X	X	X	L	Z

**NOTE:**

- X = Don't Care
- L = Low Voltage Level
- H = High Voltage Level
- Z = Three-State

### DC ELECTRICAL CHARACTERISTICS

OVT = IVT = V<sub>CC</sub>E = 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>CC</sub> L	Power Supply Current	—	120	—	120	—	120	mA	Total all OVT, IVT, and V <sub>CC</sub> E pins
I <sub>CC</sub> H		—	120	—	120	—	120		

### TTL DC ELECTRICAL CHARACTERISTICS

OVT = IVT = V<sub>CC</sub>E = 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>I</sub> H	Input HIGH Voltage	2.0	—	2.0	—	2.0	—	V	
V <sub>I</sub> L	Input LOW Voltage	—	0.8	—	0.8	—	0.8	V	
I <sub>I</sub> H	Input HIGH Current	—	20 100	—	20 100	—	20 100	μA	V <sub>I</sub> N = 2.7 V V <sub>I</sub> N = V <sub>CC</sub>
I <sub>I</sub> L	Input LOW Current	—	-0.4	—	-0.4	—	-0.4	mA	V <sub>I</sub> N = 0.5 V
V <sub>O</sub> H	Output HIGH Voltage	2.0	—	2.0	—	2.0	—	V	I <sub>O</sub> H = -3.0 mA
V <sub>O</sub> L	Output LOW Voltage	—	0.5	—	0.5	—	0.5	V	I <sub>O</sub> L = 24 mA
V <sub>I</sub> K	Input Clamp Voltage	—	-1.2	—	-1.2	—	-1.2	V	I <sub>I</sub> N = -18mA
I <sub>O</sub> S	Output Short Circuit Current	-100	—	-100	—	-100	—	mA	V <sub>O</sub> H = 0V

**10H ECL DC ELECTRICAL CHARACTERISTICS**OVT = IVT = V<sub>CC</sub>E = 3.0V to 3.6V

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>	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:**1. V<sub>IH</sub>, V<sub>IL</sub> and V<sub>BB</sub> are referenced to V<sub>CC</sub> and will vary 1:1 with the power supply. The levels shown are for V<sub>CC</sub> = +3.3V.**100H ECL DC ELECTRICAL CHARACTERISTICS**OVT = IVT = V<sub>CC</sub>E = 3.0V to 3.6V

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>	2.135	2.420	2.135	2.420	2.135	2.420	V	V <sub>E</sub> = 3.3V
V <sub>IL</sub>	Input LOW Voltage <sup>(1)</sup>	1.490	1.825	1.490	1.825	1.490	1.825	V	V <sub>E</sub> = 3.3V
V <sub>BB</sub>	Output Reference Voltage <sup>(1)</sup>	1.920	2.040	1.920	2.040	1.920	2.040	V	V <sub>E</sub> = 3.3V

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

**AC ELECTRICAL CHARACTERISTICS**

IVT = OVT = VCCE = 3.0V to 3.6V

Symbol	Parameter	TA = 0°C			TA = +25°C			TA = +85°C			Unit	Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
tPLH	Propagation Delay ECLK to Q	2.3	—	3.3	2.25	—	3.25	2.2	—	3.2	ns	CL = 20pF
tPHL	TCLK to Q	2.3	—	3.3	2.25	—	3.25	2.2	—	3.2		
tskpp	Part-to-Part Skew <sup>(1,4)</sup>	—	—	0.5	—	—	0.5	—	—	0.5	ns	CL = 20pF
tskew++	Within-Device Skew <sup>(2,4)</sup>	—	—	0.3	—	—	0.3	—	—	0.3	ns	CL = 20pF
tskew--	Within-Device Skew <sup>(3,4)</sup>	—	—	0.3	—	—	0.3	—	—	0.3	ns	CL = 20pF
tr	Rise 0.8V to 2.0V	0.3	—	1.5	0.3	—	1.5	0.3	—	1.5	ns	CL = 20pF
tf	Fall Time 0.8V to 2.0V	0.3	—	1.5	0.3	—	1.5	0.3	—	1.5	ns	CL = 20pF
tPW	Output Pulse Width										ns	CL = 20pF
	66MHz @ 2.0V	5.5	—	—	5.5	—	—	5.5	—	—		
	66MHz @ 0.8V	5.5	—	—	5.5	—	—	5.5	—	—		
	60MHz @ 2.0V	6.0	—	—	6.0	—	—	6.0	—	—		
	60MHz @ 0.8V	6.0	—	—	6.0	—	—	6.0	—	—		
tStability	Clock Stability <sup>(7)</sup>	—	—	±75	—	—	±75	—	—	±75	ps	CL = 20pF
fMAX	Maximum Input Frequency <sup>(5,6)</sup>	160	—	—	160	—	—	160	—	—	MHz	CL = 20pF

**NOTES:**

1. Device-to-Device Skew considering HIGH-to-HIGH or LOW-to-LOW transitions at common Vcc level.
2. Within-Device Skew considering HIGH-to-HIGH transitions at common Vcc level.
3. Within-Device Skew considering LOW-to-LOW transitions at common Vcc 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 fMAX value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.
7. Clock stability is the period variation between two successive rising edges.

**PRODUCT ORDERING CODE**

Ordering Code	Package Type	Operating Range
SY10H646LJC	J28-1	Commercial
SY10H646LJCTR	J28-1	Commercial
SY100H646LJC	J28-1	Commercial
SY100H646LJCTR	J28-1	Commercial

**ADDITIONAL INFORMATION**

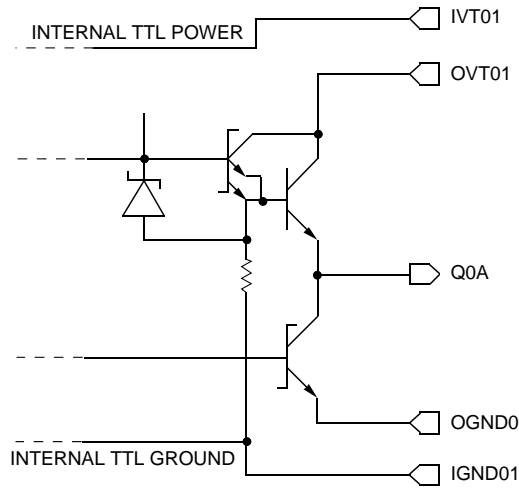


Figure 1. Output Structure

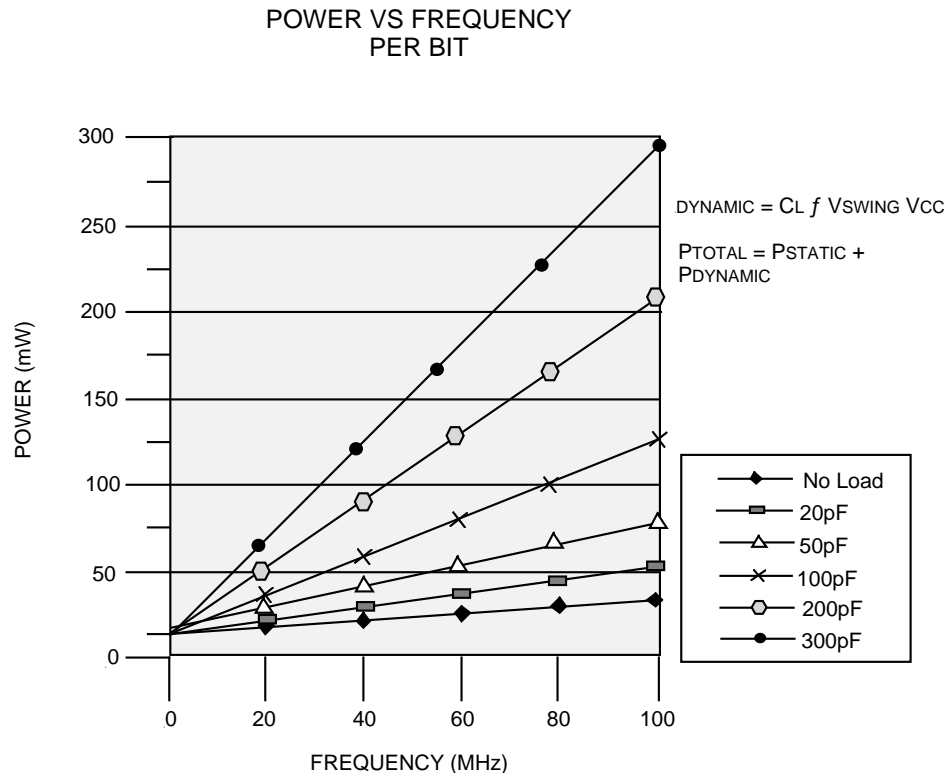
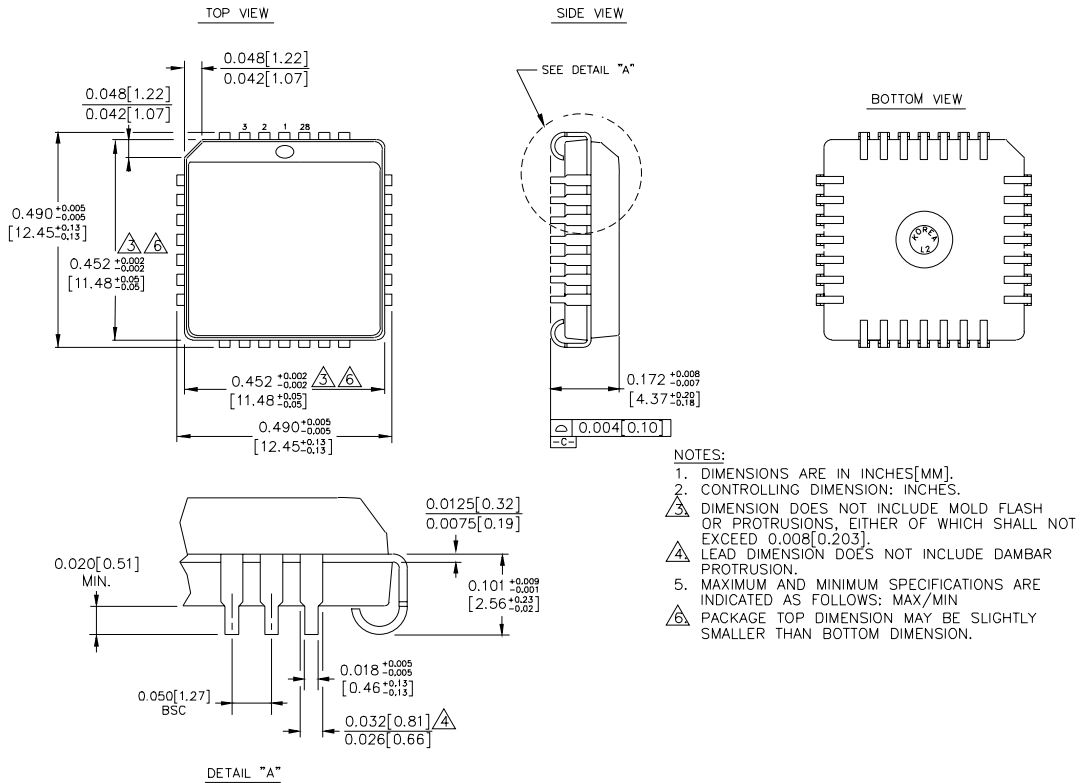


Figure 2. Power Versus Frequency (Typical)

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



Rev. 03

**MICREL-SYNERGY 3250 SCOTT BOULEVARD SANTA CLARA CA 95054 USA**

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