

## FEATURES

- 3.3V power supply
- Translates positive ECL-to-TTL (PECL-to-TTL)
- 300ps pin-to-pin skew
- 500ps part-to-part skew
- Differential internal design for increased noise immunity and stable threshold inputs
- VBB reference output
- Single supply
- Enable input
- Extra TTL and ECL power/ground pins to reduce cross-talk/noise
- High drive capability: 24mA each output
- Fully compatible with industry standard 10K, 100K I/O levels
- Available in 16-pin SOIC package



Precision Edge®

## DESCRIPTION

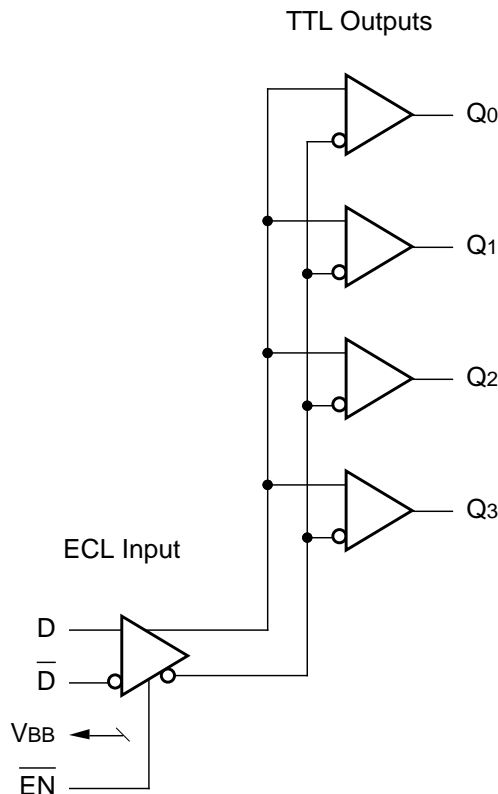
The SY10/100H842L are single supply, low skew translating 1:4 clock drivers.

The devices feature a 24mA TTL output stage, with AC performance specified into a 20pF load capacitance. A HIGH on the enable pin ( $\overline{EN}$ ) forces all outputs LOW.

As frequencies increase to 40MHz and above, precise timing and shaping of clock signals becomes extremely important. The H842 solves several clock distribution problems such as minimizing skew (300ps), maximizing clock fanout (24mA drive), and precise duty cycle control through a proprietary differential internal design.

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

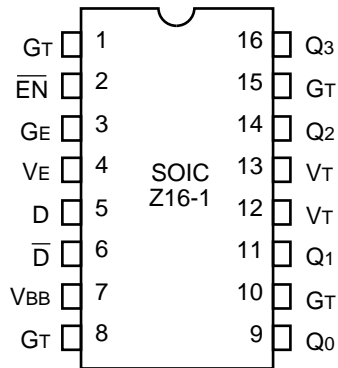
## BLOCK DIAGRAM



## PIN NAMES

Pin	Function
GT	TTL Ground (0V)
VT	TTL Vcc (+3.3V)
VE	ECL Vcc (+3.3V)
GE	ECL Ground (0V)
D, $\overline{D}$	Signal Input (PECL)
VBB	VBB Reference Output (PECL)
Q0 - Q3	Signal Outputs (TTL)
$\overline{EN}$	Enable Input (PECL)

**PACKAGE/ORDERING INFORMATION**



**16-Pin SOIC (Z16-1)**

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

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10H842LZC	Z16-1	Commercial	SY10H842LZC	Sn-Pb
SY10H842LZCTR <sup>(2)</sup>	Z16-1	Commercial	SY10H842LZC	Sn-Pb
SY100H842LZC	Z16-1	Commercial	SY100H842LZC	Sn-Pb
SY100H842LZCTR <sup>(2)</sup>	Z16-1	Commercial	SY100H842LZC	Sn-Pb
SY10H842LZH <sup>(3)</sup>	Z16-1	Commercial	SY10H842LZH with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY10H842LZHTR <sup>(2, 3)</sup>	Z16-1	Commercial	SY10H842LZH with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100H842LZG <sup>(3)</sup>	Z16-1	Industrial	SY100H842LZG with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100H842LZGTR <sup>(2, 3)</sup>	Z16-1	Industrial	SY100H842LZG with Pb-Free bar-line indicator	NiPdAu Pb-Free

**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.

**TRUTH TABLE**

D	EN	Q
L	L	L
H	L	H
X	H	L

**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) VOUT (TTL)	Input Voltage	0.0 to VEE 0.0 to VT	V
TLEAD	Lead Temperature Range (soldering, 20sec.)	+260	°C
Tstore	Storage Temperature	-65 to +150	°C
TA	Operating Temperature	0 to +85 -40 to +85	°C °C

**Note:**

1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**PIN DESCRIPTION**

Pin	Symbol	Description
1	GT	TTL Ground (0V)
2	EN	Enable Input (PECL)
3	GE	ECL Ground (0V)
4	VE	ECL Vcc (+3.3V)
5	D	ECL Signal Input (Non-inverting)
6	D	ECL Signal Input (Inverting)
7	VBB	VBB Reference Output (PECL)
8	GT	TTL Ground (0V)
9	Q0	Signal Output (TTL)
10	GT	TTL Ground (0V)
11	Q1	Signal Output (TTL)
12	VT	TTL Vcc (+3.3V)
13	VT	TTL Vcc (+3.3V)
14	Q2	Signal Output (TTL)
15	GT	TTL Ground (0V)
16	Q3	Signal Output (TTL)

**DC CHARACTERISTICS**

VT = VE = +3.0V to +3.6V

Symbol	Parameter		TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
			Min.	Max.	Min.	Max.	Min.	Max.		
IEE	Power Supply Current	ECL	—	35	—	35	—	35	mA	VE Pin
ICCH	Power Supply Current	TTL	—	20	—	20	—	20	mA	Total all VT pins
ICCL			—	25	—	25	—	25		

**TTL DC ELECTRICAL CHARACTERISTICS**

VT = VE = +3.0V to +3.6V

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 = -3.0mA
VOL	Output LOW Voltage	—	0.5	—	0.5	—	0.5	V	IOL = 24mA
Ios	Output Short Circuit Current	-80	—	-80	—	-80	—	mA	VOUT = 0V

## 10H 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 <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	2.130	2.460	2.170	2.490	2.240	2.580	V	$V_E = 3.3V$
V <sub>IL</sub>	Input LOW Voltage	1.350	1.820	1.350	1.820	1.350	1.855	V	$V_E = 3.3V$
V <sub>BB</sub>	Output Reference Voltage	1.920	2.030	1.950	2.050	1.990	2.111	V	$V_E = 3.3V$

**Note:**

1. ECL V<sub>IH</sub>, V<sub>IL</sub> and V<sub>BB</sub> are referenced to V<sub>CC</sub>E and will vary 1:1 with the power supply. The levels shown are for I<sub>VT</sub> = I<sub>VO</sub> = V<sub>CC</sub>E = +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 <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	2.135	2.420	2.135	2.420	2.135	2.420	V	$V_E = 3.3V$
V <sub>IL</sub>	Input LOW Voltage	1.490	1.825	1.490	1.825	1.490	1.825	V	$V_E = 3.3V$
V <sub>BB</sub>	Output Reference Voltage	1.920	2.040	1.920	2.040	1.920	2.040	V	$V_E = 3.3V$

**Note:**

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

## AC CHARACTERISTICS

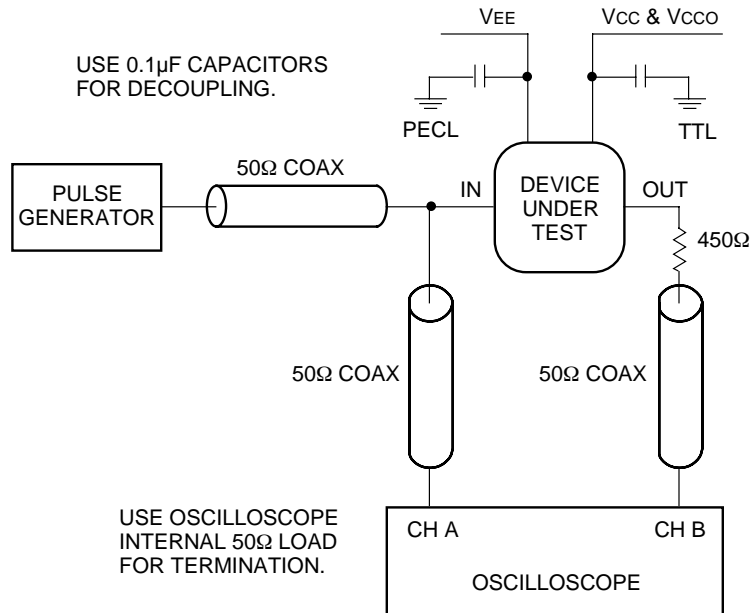
$V_T = V_E = +3.0V$  to  $+3.6V$

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 <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Output	Q <sub>0</sub> –Q <sub>3</sub>	2.2	3.2	2.1	3.1	2.0	3.0	ns	CL = 20pF
t <sub>skpp</sub>	Part-to-Part Skew <sup>(1,4)</sup>	Q <sub>0</sub> –Q <sub>3</sub>	—	0.5	—	0.5	—	0.5	ns	CL = 20pF
t <sub>skew++</sub>	Within-Device Skew <sup>(2,4)</sup>	Q <sub>0</sub> –Q <sub>3</sub>	—	0.3	—	0.3	—	0.3	ns	CL = 20pF
t <sub>skew--</sub>	Within-Device Skew <sup>(3,4)</sup>	Q <sub>0</sub> –Q <sub>3</sub>	—	0.3	—	0.3	—	0.3	ns	CL = 20pF
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay EN to Output	Q <sub>0</sub> –Q <sub>3</sub>	2.2	3.2	2.1	3.1	2.0	3.0	ns	CL = 20pF
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Time 1.0V to 2.0V	Q <sub>0</sub> –Q <sub>3</sub>	—	1.5	—	1.5	—	1.5	ns	CL = 20pF
f <sub>MAX</sub>	Max. Input Frequency <sup>(5,6)</sup>	Q <sub>0</sub> –Q <sub>3</sub>	160	—	160	—	160	—	MHz	CL = 20pF

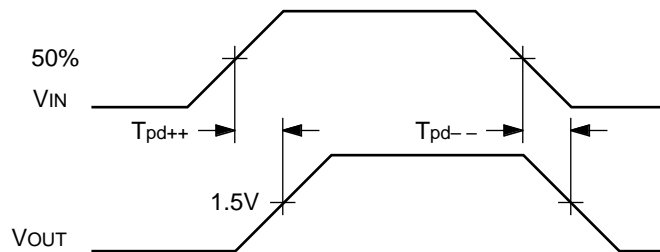
**Notes:**

1. Device-to-Device Skew considering HIGH-to-HIGH transitions at common V<sub>CC</sub> level.
2. Within-Device Skew considering HIGH-to-HIGH transitions at common V<sub>CC</sub> level.
3. Within-Device Skew considering LOW-to-LOW transitions at common V<sub>CC</sub> 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<sub>MAX</sub> value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

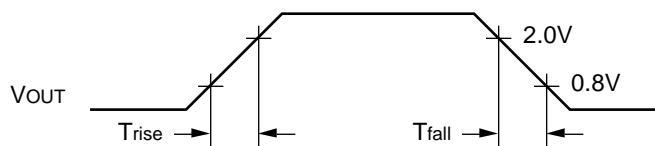
## TTL SWITCHING CIRCUIT



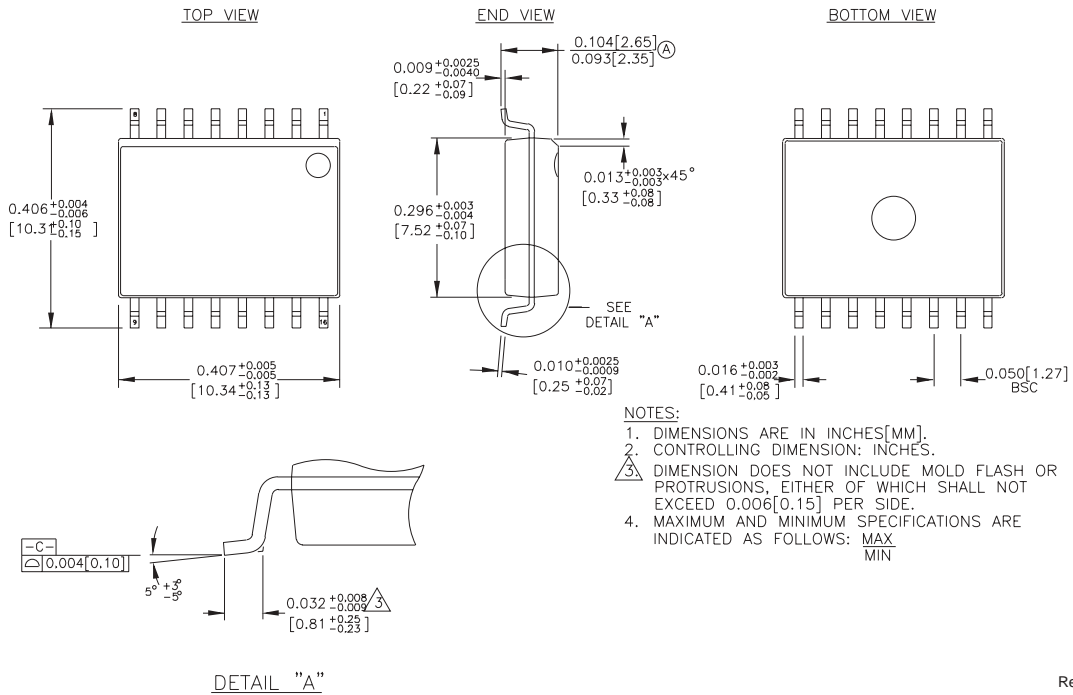
## ECL/TTL PROPAGATION DELAY — SINGLE ENDED



## ECL/TTL WAVEFORMS: RISE AND FALL TIMES



**16-PIN SOIC .300" WIDE (Z16-1)**



Rev. 03

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